AGRICULTURE DELINEATED:

OR, THE

Farmer's Complete Guide;

BEING

A TREATISE ON LANDS IN GENERAL:

SHEWING

The best Methods of cultivating and improving the different soils, for the raising of Wheat, Barley, Oats, Pease, Beans, Vetches, Lentils, Turnips, &c. &c.

ALSO,

REMARKS ON THE MANAGEMENT OF NATURAL AND ARTIFICIAL GRASSES,

AND

Directions for Plowing, sowing, MANURING, &c. according to the New and Old Husbandry.

WITH COMPARISONS MADE FROM

EXPERIMENTAL OBSERVATIONS.

By GUSTAVUS HARRISON, Esq.

The Whole methodized in a plain and familiar Stile, for the Use of the COUNTRY GENTLEMAN and FARMER.



LONDON:

Printed for the AUTHOR, and fold by J. WILKIE, No. 71, St. Paul's Church-Yard, M.DCC.LXXV.

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PREFACE.

THE number of books published within a short period of years on the subject of Agriculture, might, perhaps, induce some to think, that little more could be offered, with regard to that necessary employment, which could benefit the present age, or prove

useful to the rifing generation.

But a little reflexion will be sufficient to prove that such an opinion is erroneous, and founded on false principles. For, besides the exhaustless source the subject naturally surnishes, it will be but just to allow, that many of the modern Treatises, as well as some ancient ones, are rather sounded upon mere philosophical theory, than on that experience which results from practice, and which alone can be depended on in matters relative to Husbandry.

M. du Hamel and M. Chateavieux themfelves, have sometimes run into this error, or (which was very little better) have given us the result of such experiments as they have made, rather in the quality of the crops, than the proportion of profit which was gained by them. Many of the experiments themselves, especially those relative to the New Husbandry, which they have argued upon as decisive, have by no means turned out so, upon a strict examination; and thus

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the reader has often been missed, as, perhaps, even these gentlemen themselves may have sometimes been, by the application of such

experiments.

An author of our own country, who has favoured the Public with a long course of Practical Husbandry stretched to a vast extent, has, in one of the principal of these, feemed rather remiss. Having minuted down the experiments he made, with his observations thereon, it will be found on perufing them, that these observations being only the refult of each experiment, are frequently different, and fornetimes directly contradictory to each other. It is true, that they were generally fuch as the fuccess of his trials fuggested; but as the end of the series could alone determine the matter certainly, thele must be considered as only serving to swell the book out, without being of any real use to the reader.

Indeed, one of the great evils complained of, and which seemed particularly to deserve attention, has been the enormous fize, and the great expence attending the purchase of most of the systems of Agriculture now extant. Few Farmers, &c. will go to the price of such performances, still sewer will spare the time to read over either large, or complicated differtations on a subject, which can scarcely be treated in a manner too short or simple, provided the necessary directions be given, and the rules of practice properly demonstrated.

It is true, that the first principles of things in works of this kind, where there are points in dispute, must sometimes be resorted to, it is proper that the opinions of ingenious men, in such cases, may sometimes be recited, and should be treated with a proper degree of deference; but never are they to be followed where experimental truths declare against them; and where they are dubious, the propriety or impropriety of them can alone be demonstrated by a fair trial, which those, who have it in their power, would always do well to bestow upon them, since le this

The great necessity of good tillage, and a proper manure, which has always been recommended by the most rational writers upon this subject, includes a great deal more than either the numberless inventions of complicated instruments, or the multiplication of laboured Treatises upon this subject; the first of these ought always to be attended to, the others will frequently prove useless or per-

plexing or whalestired borneel doidy To guard against the evils complained of, to fum up the principles of Agriculture in a short compass, yet so as that nothing material might be omitted, and to lay down plain and simple rules for the husbandman to go by, are the intentions of the author of this work, who has nothing more at heart than the encouragement of Agriculture in these kingdoms, ib vialisasa adv bebivore, simul

The great defire which now prevails in our country of improving in useful knowledge, A . 2 has has long been conceived as a favourable omen to the arts and sciences. The promotion of the works of Husbandry, in its various branches, have not formerly been thought below the attention of princes, warriors, and senators; surely then we may entertain a rational hope, that in Britain all attempts for improvement of this kind will be countenanced, and the farmer, without whom the gentleman cannot subsist, be aided in every

respect in his useful labours.

The following sheets contain not the mere reveries of philosophers, a detail of hypothefes built only on suppositions; or a tedious recital of useless and indecisive experiments. They are not filled with the continual praises of one particular kind of Husbandry, nor the absurd complaints of another. They form a work which has been written and digested with care, and confirmed by practice, wherein also the best authors have been occasionally consulted upon the subject, all that was necessary has been adopted, all was superstudy omitted, according to the best judgement of the author, who has long been conversant with affairs of Husbandry.

To the Public, who have a right to works of this kind, this Treatife is dedicated and devoted, not so much from the hopes of any gain that may accrue to the author, as from his view of contributing all that is in his power to the promotion of one of the most useful of arts, and endeavouring, as

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far as lies within his sphere, to benefit his country amount as a bevience and and and

The reception which the book may meet with, is entirely rested upon its merit; it can only be observed, that if a concise, but at the same time A Complete System of Practical Husbandry, compiled with the greatest care, as it was attempted with the greatest caution, can prove acceptable to those who have the welfare of Great-Britain at heart, then the Farmer's Guide may be presumed, in some degree, to merit the

The following the sildure at positions of philosophers, a detail of hypothermore fees built only on suppositions; or a tedious recital of useless and indecinive experiments. They are not filled with the continual praises of one particular kind of Husbandry, nor the about complaints of another. They form a work which has been written and digested with care; and confirmed by practice, wherein also the best authors have been occasionally consulted upon the subject; all that was necessary has been adopted, all was superstuous consisted, according to the best supposed of the best gudgement of the author, who has long been sudgement of the author, who has long been

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INTRODUCTION.

AGRICULTURE has ever been considered by judicious persons as the most simple, but at the same time in reality, the most permanent source of riches to any country where it is encouraged. Certain it is, that trade and commerce can never flourish in a degree beneficial to the natives where agriculture is not properly encouraged, as the latter most undoubtedly is the chief cause of the increase of people, and the certain means of their subsistance.

The adventitious helps of trade and commerce undoubtedly have not been without their use; but these are liable to abuses which are not incident to agriculture; they will introduce luxury in every nation; they have already done it amongst us, and the consequences are such as must ever be dreaded

by a free people,

After all the exalted ideas which some have entertained of the good effect of our present great improved commerce, it will still remain a matter of doubt, whether we are in reality the richer in real wealth, any more than the better in good principles, for these improvements, which have taken up so much of the care of our subjects, as scarcely to leave them time to attend to the necessary business of husbandry.

That the encouragement of trade in its first beginnings was proper, is what we would not be understood to contest; but that its excess is productive of many evils, is a truth that is no less certain, the effects of which begin already to be felt amongst us, and which future ages may perhaps unhappily

tend still more strongly to confirm.

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The monopoliting of farms, which is in a great measure owing to the men of property reforting to the capital, is an evil that has very justly been complained of, which certainly takes its rife in the artificial wants of those who are called the great, who can by no means have patience for the collecting of the rents of lands divided into small farms, as they generally have appropriated the money before it becomes due; for which reason their stewards so often advise them to throw numbers of them into one large lot, to raise the rent, and let the whole together, by which means they urge it is much more easy to be collected .- The bad confequences attending such a conduct, are too well known to be here dwelt upon; it may not, however, be amiss to observe, that the landed gentlemen themselves are not such great gainers by these methods of repairing to London, raising rents, and monopolifing farms, as at first might be imagined. This metropolis, which is in a measure supported by the luxuries of the rich, makes them pay dear for those luxuries. The very articles which their own lands once furnished cheaply to them, are raised in value by the same methods which they take to increase their income, and thus, the balance being struck, upon an average, is against them; a circumstance well worth their serious attention.

With regard to trade and commerce, we are told of the great wealth which they bring to this nation; but if it is proved, that these have greatly contributed to the enormous price of provisions by increasing luxury, and by various other means, will not this prove likewise, that much of that boasted wealth is *ideal*, and that the bulk of this nation are little the richer, not at all the happier for it. The reader will observe, however, that I

mean here only to speak of trade in its excess. In a medium it is useful; but there is a certain proportion that it always bears to agriculture in every country, which, being transgressed, is always attended with a train of evils, such as many states have experienced, such as may Heaven avert from the inhabitants of this island!

Our American trade was once the great object of attention; that trade feems now to be reduced to nothing. To enter upon the nature of the difputes sublisting between the mother country and her colonies, would be foreign to our purpose; but it may be pertinent enough to observe, that the parallel latitudes in which some of the latter are fituated, their possibility of raising the same fort of commodities, &c. were circumstances which might induce people who reasoned deeply, to conclude, that this would fome time or other be the case.—At the same time it is a truth, that the great expectations railed upon the American trade in its more flourishing period, occasioned the manufacturers in this country greatly to increase, who esteemed it as a permanence, and doubted not of its yielding a constant and comfortable supply to themselves and their families.

This golden dream feems now upon the point of vanishing; and the consequence is, that numbers of our manufacturers and labouring poor, are likely to starve, or must be obliged to emigrate from their country, at a time when such colonisation is become no longer useful. These are evils which could not have arisen from an attention to agriculture; they could not have happened but from an excess of commerce.

That agriculture flourished amongst the ancient Romans, is a truth which needs not here be proved, history will evince it; and if it were consistent with that

that military state, reasoning from consequences, we may fairly conclude, that it may with propriety, be encouraged by any warlike nation in modern Europe.—In proportion as agriculture has declined among a people, strength of body, and vigour of mind, seem generally to have declined also. Excess of trade has introduced luxury; that luxury has introduced esseminacy; and the consequent corruption of manners is what needs not here be described. Wherever it takes place, it is felt in its effects, and these form the best arguments against it.

Those brave chiefs, who could come from the plough to the command of armies, and their duty being done, could withdraw to take the pleasures of a rural life again, doubly benefited their country; but those who go from the toilette to the field, are likely to make equally bad soldiers, and useless members of society. To use the words of the poet,

- Twas not the race of fuch as thefe,
- That quell'd the stern Æacides,
- And dy'd with Punic blood the conquer'd feas;
- That forc'd ev'n Hannibal himself to yield,
- And won the long disputed world at Zama's fatal field.
- But Soldiers of a RUSTIC mould,
 - Rough, hardy, feafon'd, manly, bold, &c.

It was from toils like these that Rome rose to empire, and became the great mistress of the conquered world; but when at last Carthage had submitted to her arms, and the whole earth poured its stores into her lap, then it was that luxury overturned the queen of nations, and destroyed the work of ages.

Trade is compounded of feveral interests. Commerce renders us dependant in some measure either upon our own colonies, or on foreign connexions; whereas agriculture is simple in its nature, and collects collects, as it were, every thing within itself. Its views are limited, yet proper; and it cannot fall but with some great revolution of the realm.— even in such case, it will only be properly faid to change hands; trade may turn into other channels, commerce may stagnate, but husbandry can never be abandoned, where it has once been practised, without totally ruining the country.

We are not indeed to learn, that the Barbarians, who over-ran the Roman Empire, paid little attention to agriculture, we know that is the case with the North American natives at this day; but surely none will pretend to say, that either of these can furnish patterns which it is proper for civilized people to follow, or that they have ever adopted a way of life which we can allow to be illigible.

Agriculture, in effect, should be regarded as the first principle of civilised establishment. And as to the politeness so much talked of by some, it has justly been observed by a modern author, to have been neglected rather by the hunter than the farmer; and he justly adds, of the latter rank of men, that when uncorrupted by modern manners, all that politeness which is properly termed humanity, is generally found among them; the rest being only an incumbrance of ceremony, which merits neither praise nor attention; and he adds with equal justice, that the appellation of rude, was never given to fuch really useful occupations, till luxury had debauched mankind, and a frivolous pertness usurped the place of sense and manners. Till then, men naturally esteemed an art of which every day's experience shewed them the absolute necessity, as well as the great advantages. " If the generality of country gentlemen (adds he) are reproached with what is called rufticity of manners, it is their paffion for sporting,

and not their application to agriculture, which gives them that behaviour,"

After having observed thus much in regard to agriculture in general, it may be proper to make some observations on the nature of plants, and what is esteemed to be their food.—Lord Bacon, and some others, have declared it as their opinion, that, for the neurishment of plants, water was generally to be effeemed as almost all in all. Helmont planted a willow tree weighing five hundred pounds in two hundred pounds of earth, dried in an oven, and watered it with rain or distilled water, the case wherein it stood being properly secured with a perforated tin cover, to prevent the admission of any other earth. Five years after, the tree being weighed, with all the leaves which it had produced in that time, its weight was found to be one hundred and fixty-nine pounds and three ounces, while the earth was only two ounces diminished in its weight.

It has been the remark of another author, that water of itself seems to be a soil proper for vegetables, chiefly on account of its disposition to infinuate and fertilife, which is affigned as a reason why floated grounds are generally found fo fertile after the floods have subsided. "It is the nearest of kin (fays he) to the whole vegetable race; for to affert with any confidence what portion of the mere earth passes into their composition, or whether the earth serves only for stability, or as a womb or reception for their feeds, I shall not pretend to discuss, though I do not yet conceive the earth to be altogether fo dull and inactive as to afford no other aid to the generation of what she bears, the diversity of soils being infinitely various, and the difference of invilible infulions far beyond our arithmetic. But neither do I here by any means

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tioned.

exclude the air, or deny its perpetual commerce and benign influence, charged as it comes with those pregnant and subtle particles which pervading and infinuating into the earth more fleady and less volatile falts, that intestine fermentation is begun and promoted, which gives life, growth, and motion to all fhe produces. It has been found, that the most exhausted and worn-out mould is repaired by a bare exposure to the air alone, without which it produces nothing. Nor can plants totally excluded from the air live, or fo much as erect themselves to any thriving purpose, as being deprived of that breath and vital balm which no less contributes to their growth and nourishment than does the earth itself, with all our affiftance. Befides, we find that the air is of near kin and affinity to water, and indeed feems as if it were but a thinner water; for how else are vines and other trees of prodigious growth maintained among barren rocks and thirsty pumices, where rains but feldom fall, if not from the benign influences of the air?" It is likewise to this aerial moisture, as it is observed, that most of the fedum kind owe their growth, as also the fucculent groundfel and fragrant wall-flower. There is even an instance of an ash growing out of the wall of the abbey church of St. Albans, which is reckoned as affording a proof of this affertion.

But Dr. Woodward, who has tried experiments of this nature, feems to be of opinion, that not the water or air, but the terrestrial particles (though infinitely small) of which they were vehicles, contributed chiefly to the growth of vegetables, having found that a great deal of this terrestrial matter was infused into the plants, and that they were more or less nourished in proportion as the water in which they stood contained a greater or less quantity of that matter. With regard to the tree above-men-

tioned, and other plants nourished in water, he observes, that the conclusions drawn from such experiments cannot be allowed, unless the water used for that purpose could be obtained entirely pure and homogeneous, which is not the case, and consequently the inference falls to the ground.

Of all the four elements which we are taught to believe simple, it is certain that not one of them is to be found pure and unmixed. Even fire, which is the purest we know of, is not to be procured, or at least not to be traced in its simple flate. The air is well known to abound both with watry and earthy, as well as fiery particles. earth, we find to be penetrated by water; and as to the element of water, even the clearest we have, is certainly filled with extraneous matter; and though by filtring and distillation much of this is taken away, yet it is justly observed, that more will still remain, as will evidently appear to those who chuse to make the experiment, of putting some of the purest fort into a close-stopped phial; this will at first grow cloudy, and at last it will deposit a fediment, what care foever may be taken to prevent fuch a confequence, in finm to do sitt add

It has besides been observed, that the willow, poplar, and those plants which are considered as merely aquatic, are generally found to be weaker than such as draw their nourishment from the earth; and even the former are found to thrive better when the water is changed, which, it is afferted, would not be the case if there were no foreign substances in the water, the power of which is, at length, exhausted by the suction of those vegeta-

bles that grow therein dw o boot larrey une vo

"Both spring and rain water (says a judicious author) contain nearly an equal quantity of vegetable matter; river water more than either of them. Nor can any doubt be made, but that the

water which falls in rain at fome times, is more charged with particles fit for the vegetation of plants than that which falls at others, A more powerful degree of heat must draw up a larger quantity of that matter, with the humid vapours which form rain, than a more feeble warmth poffibly can. The water of one spring may also flow with a higher charge of this matter than that of it another; this depending partly upon the quickness of the ebullition of the water, and partly upon the quantity of that matter latent in the earth, through which the fluid passes, and the greater or less laxity of that earth. For the same reason, the water of one river may abound with it more than that of another; and even the fame river, when much agitated, may bear up more of it than when it moves with less rapidity." Ib one garriff ye aguoris

These are remarks of great weight, at the same time that those who have made them have allowed, that though water is not the only, yet it is a most necessary agent in the growth of plants, incorporating that nourishment which otherwise would want a vehicle of conveyance to them; and as such, the use of it must always be regarded. But heat, as to raising the sap and perfecting the plant, must always be found concurring with this and every other aid of vegetation. The season of summer sufficiently points out the use of it; that of winter, the effects of its absence. The sun, indeed, is the great supporter of the vegetable, and even of animal creation; without its benign influence both must inevitably perish.

Whether plants of different forts are nourished by one universal food, or whether each imbibes an aliment peculiar to itself, has been a question long agitated. That the willow thrives best in a moist, the pine and fir in a dry earth, are truths that cannot be contested; yet as these, and other vegetables

of a different nature, often are found to draw their nourishment from the same piece of ground without injuring each other, it does not make for the argument of their requiring a particular kind of juices. It rather appears, that all forts of plants affimilate to themselves certain particles, which take different forms according to the plants they are infused into; and it is well remarked, that if all drew from the earth only juices peculiar to themselves, then the weeds which spring among corn would do the latter no more injury, than fo many dry branches planted amongst it, the contrary of which is found to be indifputably the case. In effect, the grafting of foreign branches upon trees, and many other fuch experiments, have fufficiently proved that every kind of vegetable has its stamen in itself, which, though it may be encouraged or checked by particular circumstances or accidents, can never be changed by any alteration whatfoever in its fituation, or necessary aliment.

To enter more deeply into this argument would be foreign to our purpose; but thus much may prove useful to the husbandman, and especially to all fuch as chuse to embark in experimental Agriculture, the original first principles of which, explained in a fimple manner, cannot but tend to

their real benefit and instruction.



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Of the breaking up and improving uncultivated Lands.

Of clearing Woods, draining Marshes and Bogs,
and the Advantages which may arise from such
Undertakings.

as and fome other parts, where there

As it is certainly the first part of practical husbandry, to be acquainted with the methods proper to be used in removing those obstacles which Nature, or various incidents, may have thrown in the way of cultivation, we shall begin this treatise with speaking of uncultivated lands, such as are over-run with woods, or abound in marshes, bogs, and the like, as well as such as are generally reputed, from the temperament of the soil or climate, to be barren and unprofitable.

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And here it is proper to observe, that there is scarcely any real difficulty, at least in temperate climates, which will not yield to industry. Man, armed with the plough and spade, is commonly found victorious over the most stubborn soil, and where the lands he attempts to fertilise do not at last answer the end he proposes to himself, it is much more often owing to a wrong method of cultivation, than to any latent cause in Nature.—
"The earth is not in itself (as an ingenious writer on these subjects says) the cause of scantiness of increase, for the Creator has endowed it with perpetual youth and fruitfulness.—The earth and Nature are still the same."

But there are some lands which cannot be brought to any degree of culture without much pains and trouble; it is of these that I shall treat in this chapter. And first I shall begin by the mention of those which are over-run with woods, which must necessarily be cleared away, to render them sit for the

operations of husbandry.

. In places where timber is valuable, there is great care taken in the clearing fuch grounds to preferve it, the stumps of the trees are grubbed up, and even the digging for their roots is attended with profit fufficient to repay the expence of the labour. But in America, and fome other parts, where there is much land unoccupied, and wood bears but a very low price, instead of cutting down the woods, when they want to turn a piece of woodland into arable, they let fire to the underwood, leaves, &c. and the flames fail not likewife to burn the trees, or at least so much to scorch them, that in a little time they perish. Nor do the labourers in general, in the latter case, take the trouble of felling them, but they are left to rot and die upon the ground; though by this method much inconvenience often arifes

arises when the land is afterwards submitted to the

plough.

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There have been instruments invented in various countries for rooting up trees, and experiments of this kind have been tried before the Royal Society at London; but there is one method which answers the purpose as well, where the roots are very large and deeply infixed, and that is, blowing them up with gunpowder, which at once removes the obfacle.

It is observable, that where a place has been over-grown with wood, if the ground be thoroughly stirred by digging and pulling up the stumps of the trees, that one plowing in autumn is mostly found to be sufficient, and after a second in the spring, the land is prepared to bear an extraordinary crop, and will be likely to do so for many years, as the trees, on the one hand, have not exhausted the superficial earth, and on the other hand, by their falling leaves have afforded it a

plentiful and rich manure.-

Moors and boggy lands come next under confideration.—The first of these is of a black mould, sometimes found under a thick grass, but more commonly under heath or moss; when dry, it falls into a powder; before it is of a spungy nature, and resembles the substance which is found in hollow, rotten willows, and other aquatics, which leads us to conclude that it arises from rotten plants. A bed of clay, or some substance impervious to water, generally lies underneath it, which occasions the particles of such fresh bodies as may decay upon them, not being admitted into their strata, to remain upon that surface, and, drying there, increases its thickness in proportion to their quantity.

The whole mass of such soil as this is a kind of dunghill, made up of rotten timber, grass, weeds, and frequently of mud, and is indeed of itself a rich

compost, though its age and cold situation in water weakens its salts, which would happen to the strongest dunghill if too long kept.—Most mosfy grounds seem to be much alike in their qualities, differing only in the better or worse kind of mud which is mixed with them.—The more rotten the moss is, the more sit it is for vegetation.

Bogs, which may be cleared by industry, are often fusiered to grow or spread merely owing to the want of it. Ireland, which is remarkable for boggy lands, seems to furnish some instances of it. There are actually spots in that country now converted into bogs, which were plowed land in the

reign of queen Elizabeth.

The springs with which Ireland abounds (as an ingenious author observes) are generally nearly dry in the heats of fummer, and grass and weeds grow thick about the places where they broke out. In the winter they swell, run, soften, and loosen all the earth about them. The sward or scurf of the earth, which confifts of the roots of grafs, being lifted up and made furzy by the water in the winter, is dried in the spring, and does not fall together, but withers in a tuft, through which arises new grass, and that is also lifted up the next winter. By these means the spring is more and more stopped, and the scurf grows thicker and thicker, till at first it produces what is called a quaking bog; but as it grows higher and drier, the roots of the grass and other vegetables becoming more putrid, and mingling with the mud and flime of the water, it acquires a blackness, and thus it grows into a turf bog; when the vegetables rot, the faline particles are generally washed away with the water; while the oily and fulphureous remaining, are what gives this turf its inflammability.

Some quaking bogs also are occasioned by trees falling across the passage of a stream or spring, which

which, with an accession of weeds, choak and dam up the current; and as in winter the water stagnates farther and farther, so at last the whole state is covered, then a coarse grass shoots up to a vast height, which again rotting in winter falls in tusts. And sometimes the tops of stags, or grass, interwoven on the water, will become such a covering as to be strong enough to bear a man's weight.

The moss likewise with which some countries, and amongst them, Ireland, is known to abound, is of divers kinds. The light spungy turf is nothing but an assemblage of this kind of moss, all the little gutters in bogs are filled with it; it is of a slimy nature, and is so surely a vegetable, and of so quick a growth, that it greatly stops the springs, and contributes to the increase of bogs, especially that commonly called the turf or red bog, as appears from the nature of its composition.

Sometimes also flat grounds, below the level of some neighbouring lake or river, are converted into bogs, either by the overflowings of the surrounding water, which wash weeds, rotten planks, ooze and slime, or animal putrefactions, down upon it, where they remain and accumulate; or by some subterraneous communication with the waters, which gradually lift up the soil, and thus occasion

the alteration.

These are esteemed to be the principal causes of bogs; but that these may be converted to advantage, the very nature of them indicates, and various experiments that have been made upon them, have put the matter beyond a doubt with all who were acquainted with the result of them.

I cannot better conclude this article, than with the accounts of the best methods which have generally been recommended for the draining these lands, by those who have had experience of their

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efficacy.

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As these bogs are destructive to cattle, which feeding on the verdant edges of them often fall in, to the great detriment of the farmer; and as they corrupt the neighbouring waters, altering them both in colour and taste; and the vapours which arise from them are putrid and unwholesome; for these reasons, and as they frequently overspread the finest and smoothest plains, they are certainly justly esteemed most pernicious to any country; so that the inhabitants about those places which are infested with them, cannot employ their attention better than to the removal of them, which may be done by draining; and especially since by such means, they render that valuable which was

once a very great nusance.

The ingenious Mr. King observes, that the cause why this is not more generally done, is, the fear of the expence which the undertakers of fuch an useful work may draw upon themselves; but this is an objection which he presently refutes:-" For (fays he) one trench properly made, will drain many acres in quaking bogs, which, when dry, are generally meadow, or the best grazing ground.—Every red bog has about it a deep, marshy, sloughy ground, which is called, the bounds of the bog. A deep trench round such a bog keeps out cattle, and turns the bounds into good meadow. I remember (continues he) a red bog of fixty acres, which a gentleman reduced to good grazing ground worth three shillings an acre, for twenty-five pounds, which is less than three years purchase, In all improvements of this kind, gentlemen should confider that what they lay out goes by degrees, fo that they scarcely feel it, that it goes among their tenants, whom it helps to enable to pay their rent, that they do a work of charity in employing the poor, and that they at the fame time contribute both to the ornament and profit of the kingdom." The

The deep trench mentioned above serves not only to drain and improve the bounds of the bog, but is useful in draining the bog itself, and serves as a common sink for the other shallower drains, which are to be cut so as to cross the little sloughs of it, where deep ones will not remain, but will be filled up again. Such precautions being taken, the bog will soon be fit for cattle to graze on in the summer, and the trenches deepened till they can be allowed to reach the bottom, as till that is done, the bog cannot properly be said to be secure.

The fmaller bogs may be used to advantage for planting willows and other aquatics; but they must be drained before they can be improved in

any other way.

It is here to be observed, that there are some other particulars to be attended to, according to the different nature and situation of the lands you would drain, which chiefly depend upon being certain of the sources from whence the water comes,

that it may be fluiced off accordingly.

A furrounding ditch will be necessary, into which the water may flow if it comes from the neighbouring grounds, that ditch being carried to a proper outlet, according to the declivity of the place. Cutting into the bed of gravel or fand, through which the springs within the bog run, will also prove the means of destroying them. But before you begin to drain the bog itself, you should have a level of the ground taken, and if the too great moisture proceeds from internal springs, a large ditch should be made, beginning at the lowest part of the bog where an outlet can be had, and continuing it from thence to the fpring; and if there should be more springs than one, the ditch should communicate with each of them. In the digging of ditches, care should be taken not to lay the earth taken out of it too near to the sides of the bogs,

bogs, left its weight should occasion it to fall into

There is a circumstance of a bog, or shaking meadow's being drained by the contrivance of Mr. Elliot, which, as an experiment, deferves being noticed. The fpot contained about forty acres, and was covered with cranberry vines and wild grass, which seemed to be only a sward of theirroots laid over a foft mud, which was deemed too poor to be worth any body's renting. It had but one outlet, at which there was a fufficient fall, but rocky, so that it was necessary to dig very deep to take the advantage of it. This gentleman went to make the drain in the month of March, when the torrent of water was so violent, that nothing could be done in the common mode of working. He therefore immediately caused a tree to be felled across the stream, and planks, the ends of which rested upon the tree, to be driven downwards aslant into the mud, the crevices of them being stopped up with tow: then the trench was worked on night and day till it was completed. When the weather grew warmer, and the meadow was fettled. cross ditches were cut, one upon each side, and another in the middle, and the meadow foon grew dry as far as they extended. In order that others may not be discouraged from such undertakings, on account either of the expence or difficulty attending them, Mr. Elliot adds, that when he first began this work, many thought it would be impossible for him ever to accomplish it, the place being full of rocks, fome of which were dug up, others split with steel wedges, and others again blown up with gunpowder .- After all, the whole expence did not exceed twenty pounds.

After draining this swamp, it was sown with grass seed of different forts, amongst which was the red clover, and this succeeded best, though none

of it answered as yet, on account of the wild grass and the toughness of the ground. In September, that year, he plowed up a piece of the ground where no grafs had been fown. It ploughed very tough, and the cattle mired in some places, but he kept them as much as possible upon the grass; notwithstanding which, there was a necessity for leaving many baulks. A month afterwards, he ordered these baulks to be hoed up, and was furprized to find how eafily it was done. The meadow was more mellowed one month in the fall, than it had been during the whole fummer. In July he fowed a little piece with turnips, which did not grow well till the ground began to rot in the fall of the year, when they throve perfectly; and instead of proving rank, as might be expected, had an agreeable sweetness of flavour.

By these experiments it appears, that drained lands ought to be allowed one summer to ferment wand rot, before it will be fit for any kind of grass

or grain.

In Philadelphia they raise hemp upon their drained lands, which has generally been discouraged here on account of its requiring such strong land, and so much dung to produce it; but these drained swamps give us a prospect of doing this at an easier rate; and whatever advantages are to be gained from hemp, may be procured from flax likewise, if properly managed; and there are those who have tried it with success in Scotland, and others who are now resolved to do the same, not doubting but it will sufficiently answer their purposes.

When land lies lower than the level of a river or lake, it is apt, as I have before observed, to become swampy, and there is no such thing, in this case, as draining it without first fencing it from the superior water. It is therefore necessary to understand the nature of banking, which is a matter of

so much importance in preventing, as well as re-

medying this evil.

It has been the practice of some to guard against inundations, by building upright walls of stone and lime, others by doing the same with perpendicular banks of sods; but these methods have generally proved insufficient to withstand a great body of waters, which beating upon them perpetually, have at last destroyed, and carried all away before them.

The best method, therefore, is that of constructing floping banks; these should be raised about two feet above the rife of the water at the highest tides, and their strength proportioned to the weight they are to refift. It is to be considered, that when a river is too much confined, as it swells at floods and spring-tides, so it requires banks of greater height and strength than would otherwise be necesfary; and even these it will sometimes destroy, if a proper space be not allowed for the increase of its water; but when fuch a space is allowed, the waters generally are found to spread instead of swelling, and feldom rife to any great degree above their usual level. As to the space to be allowed, that must depend upon the nature and situation of the bank: in some places from sixteen to twenty feet may be fufficient, in others an hundred, or even much more should be allowed: and it will always be better to allow too much than too little; for the ground thus left between the bank and the river, will afford good pasture in dry seasons, and consequently will not be loft to the owner; besides, as I have already faid of fwampy grounds, it may be planted to advantage with willows, and other aquatics.

In order to repel a large body of water, a trench of ten or twelve feet wide, and three feet deep, or more, as the fituation requires, should be dug,

and all the foil taken out of it laid on the fide towards the water; a space of about three feet should be left between the trench and the foot of the bank, which should be made with an easy slope of about eighteen feet in length towards the water, allowing the flope about three feet fall to one in height; but eight or nine feet will be sufficient for the inside flope, or a foot and an half flope to one perpendicular. When the bank is thus raised to the height of five or fix feet, it will be two feet wide at the top. It should also be flatted so as that people may walk upon it, and covered with gravel dug out of the channel, a circumstance which will at once ferve to strengthen the bank and deepen the river, whose depth likewise will be an additional security. Besides this, let it be sown with hay-seeds, which is a method preferable to that of turing it with fods, which are apt to thrink and part from one another, whereby they are more eafily washed away. In a month or fix weeks, the grafs fown according to these directions will be fit for mowing, and will furnish a good defence against the fury of the affaulting waves.

It is to be observed, that the trenches should always be carried as far as the banks; and in the lowest part of the ground a sluice with a valve, slap-door, or flood-gate, should be placed in the bank. The season most free from floods should be chosen for making these banks, and the work when once begun should go on as expeditiously as possible. For example, if possible it should be begun in a dry summer, and finished within a month or two, which will be the most likely method of guarding against violent storms, and securing the

permanency of the work.

Should there be a necessity of making banks, or a strand, those banks should be large, and the slope extensive; and if grass will not grow, sea-weed and furze should be planted, in order to repel the fury of the tides, and keep the bank together.

When the sea enters by a narrow passage, through which the waters being discharged, slow in and cover the land; if the waters cannot be diverted from their course, it will be adviseable to have a strong sluice fixed in the lowest part of the channel, with large piers of stone, and a strong soundation of wood or broad stones, for the current to pass over; and then let the banks be made of sand, or any other soil easiest to be procured, in the manner described, on each side of the sluice which you use to drain off the waters.

Such methods as these I myself have seen practised to advantage; by such have many hundred acres of rich land been recovered in Ireland, as well as in Lincolnshire, Cambridgeshire, and many other parts of England, where the marshy grounds would otherwise prove equally unprofitable and

offensive.

CHAP. II.

Of the Nature of different Soils, and the Methods proper for improving them.

A FTER having treated of the manner of clearing uncultivated lands, it will next follow of course, that something should be said as to the nature of different soils, what they are most fit for, and how they may best be improved by the art and industry of man.

Of all foils, clay is generally esteemed the worst for vegetation; yet even this, by care, may be made to produce plants that require the lightest mould; but this is not to be done otherwise than by using proper correctives, of which, as well as of of all other forts of improvement, I shall speak in this chapter, when to were, together, and then the

The best manure for clay is certainly sea-fand, as it is best suited to correct its stiffness and break its stubborn adhesion. When that cannot be had. It river fand, gravel, lime, builders rubbish, chalk, marle, coal aftes, and fuch bodies will be used for

this purpose with most advantage.

Of all the different forts of lea-fand, that which is stony is of the least, that which is shelly of the greatest value.—The best as to colour, are first, the reddiff, next the blue, and then the white; and that fand, if it can be well drained of the feawater, which is fresh taken is better than that which has lain long drying, as has been found by

experiments of the manufe of the consensative

The Cornish farmers spread this fand on the ground for wheat, or generally for the first crop in four. The Cornish acre contains one hundred and fixty Cornish yards. On each of these acres the husbandman bestows three hundred sadks, or horseloads, of fand, if the farm lies near enough to the fand-place, if otherwise, less in proportion; and the effect is, that the more of this manure is used, the feed is the better, and the stalk the less; where they cannot get enough, the contrary is generally expeded and the case.

It is not indeed generally at the first or second year, that the benefits arifing from this kind of fand are experienced; the reason of which is, that it confifts of shelly and hard substances, which take some time to dissolve; but being so dissolved, fail not to enrich the land, and that for many years. With regard to this particular, Mr. Miller makes the following observation.

"The use of sand (says he) is to make the clayey earth fertile, and fit to feed vegetables, &c. for earth alone is apt to coalesce, and gather into

a hard, coherent mass, as is apparent in clay; and earth thus glued, as it were, together, is in no way disposed to nourish vegetables; but if sand, &c. i. e. hard crystals, which are not dissolvable in water, and still retain their figure, be intermixed with such earth, they will keep its pores open, and the soil loose and incompact, by which means the juices will circulate, and plants be nourished thereby. By means of sand, the earth is rendered, in a manner, organical; pores and interstices being thereby maintained, somewhat analogous to vessels, by which the juices may be conveyed, prepared, digested, circulated, and, at length, excerned, and thrown off into the roots of plants."

Gravel, if well screened, or sisted, is likewise very proper for the manure of stiff or sour land; and shell-marle is likewise a very good manure for clay, because, as it dissolves easily in water, it gives a proper passage to this stud, and keeps the clay dry even in winter; besides, the absorbent quality of the marks destroys the mineral acid, and keeps the ground warm likewise, which are circumstances

worthy of the farmer's attention.

Lime has been generally efteemed a very good manure for clay; but from repeated experiments, as it is generally used, I have not found it always attended with the expected advantages. To me it feems that the best way of using it is unburned, as in that state it is most likely to mellow the clay it is applied to. Chalk has been also recommended by some; but it appears, that chalk being laid upon clay, or vice versa, the one is too apt to be lost and absorbed in the other, for any great good to be expected from their union. In other words, when overborne by rains, chalk is likely to become of a glutinous substance, so much similar to clay, as that the latter loses its quality of correcting the defects of the former. Heath Heath furnishes another kind of manure which is used for clayey soils. In this case, the heath curf should be cut up with a breast-plough, and then you should burn the heath and the turf together. About a bushel of these ashes to a load of the heath-ground unburnt, is the proportion that should be used to the land.

I shall now speak of sandy soils, which are too light to afford a sufficient stability to plants, or

moisture enough for their nourishment.

There cannot remain a doubt, but if fand is used with fuccess in clayey grounds, clay may likewise be as efficacious (if properly managed) in a fandy foil. The yellow, red, or blue clay, I have generally found to be the best for this purpose, and it becomes better when mixed with lime. The clay up used in the North Riding of Yorkshire, is dried by the farmers about Midfummer, on the declivity of a hill: they afterwards lay about an hundred loads upon an acre of dry, fandy ground, which continues for three or four years in clods upon it, and for the first year that land produces rank and illcoloured barley; but afterwards they reap from it a plump, round grain, like wheat; and even for forty years successively, the good effects of this kind of manure have been experienced.

Marle likewise is of excellent use when applied to sandy soils, but it is proper to try it, as there are many sorts, grey, blue, brown, yellow, red, or sometimes of a mixed colour. It is of a pure and uncompounded nature, and is easily broken by a blow, or will fall to pieces of itself by the action either of a sultry or a frosty air. When dry, after it has been exposed to the weather, it has the appearance of being covered with a kind of hoar frost, and the soil it is mixed with at that time will appear in the same manner. By these marks marle is distinguished, as likewise by the facility of its

diffolving if dropped when dry into a glass of water, into a fine, soft, pappy substance. It may be added, that the more this kind of soil effervesces with acids, the better it is for manure, which in these cases is a circumstance worthy of attention.

The foft blue marle is generally reckoned the best for arable land, and this is commonly found beneath a stratum of clay. The marle found on the sides of hills, and in marshy lands, is very fat and close, and is peculiarly adapted to sandy soils; and this is termed delving marle. That which is known by the name of paper marle is slaky, and lies in leaves like brown paper, but is rather of a lighter colour. What is termed clay marle is of a state nature, and is often found mixed with chalk stones. The steel marle, which as well as the last mentioned, is found under sand or clay, is known by its quality of breaking into square cubical bits, by which it is generally distinguished.

The stone, slate, or slag marle, is generally of that blue cast, to which the judicious give the preference. It is found near rivers, on the sides of hills, and is esteemed a good and lasting ma-

nure.

Rivers are frequently bordered with marle, and boggy lands fometimes cover it at the depth of about three feet, but in stiff, clayey soils, it is found to lie lower. The lower parts of most sandy lands also generally abound with it, from the depth of three feet to nine; but when once found, the marle pits themselves are so deep, that they furnish such a source of this treasure to the husbandman, as proves almost inexhaustible.

But here it may not be amis, to caution the husbandman against a body sometimes found mixed with marle, which in some respect resembles this valuable substance, but is of a nature so destructive of vegetation, that it renders any soil it is applied to, quite barren.--The apparent difference between them may be comprised under the following heads:

1. Marle takes a smooth polish from the instrument. This false marle differs from it, and has not the same taste when laid upon the tongue, after it has been exposed to the air, and is of a darkish lead colour.

2. Instead of the smooth fattiness observable in marle, this substance is both an acid, and posses-

fed of a harsh astringency.

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3. It changes the fyrup of violets red, whereas marle, being an absorbent earth, turns it green. On this last account, the trying of marle with acids is a proper method of guarding against such mistakes.---Where this pernicious manure has been used, the laying on of the true marle is likely to prove the best remedy for the barrenness it has occasioned.——

As to foils, the mould generally most favourable to vegetation, is such as retains a due degree of moisture, is of a blackish cast, and agreeable in finell, cuts somewhat like butter, though without adhering quite so much, and shines after the plough

as the share turns up the furrows.

Columella observes, that one of the best ways of judging of the goodness of land is that of digging a trench, and afterwards throwing it back into the trench, treading it down when it is returned. "If (says he) through a kind of ferment, as it were, there be more than enough to fill the trench, it is a certain sign that the soil is fat; if there be not enough, we may be sure that it is poor and lean; but if the quantity be just sufficient to fill the hole from whence it was taken, it is of a middling quality.

There can be no doubt, but that the spontaneous produce of the earth is a sure indication of the nature and quality of the ground; and though the skilful husbandman may, indeed, do much by his improvements, yet it will certainly be best for him to make these, as it were, co-operate with nature, and to plant such things, or turn the land to the uses for which she seems originally to have designed it.

In order to give proper examples, I shall just mention a few instances of this kind, which the

judicious farmer will generally attend to.

When land produces wild thyme, it is generally good for feeding cattle,---Betony and strawberries direct to wood—Camomile shews a foil mellow, and consequently fit for the production of wheat—Burnet furnishes a proof of its being proper for pasture, and mallows denote it to be best suited

for the uses of the kitchen garden.

When we find ground producing nothing but gorse, broom, holly, yew, &c. it is a sign of great coldness, and if any thing flourishes in such a soil to advantage, it is most likely to be the pine, fir, and other perennial trees and plants; but when we find the land covered with moss, rushes, wild tansy, fern, yarrow, and shrubby half-withering plants, we may depend that this is the worst of soils, as being entirely devoid of all heat and vigour.

The water which runs through, or otherwise mixes with a soil, is often of use to guide us to the knowledge of it, as this element has certainly a great share in meliorating or impoverishing a soil, as well as in the nourishment of what is planted upon it. When therefore the smell of the land, after being moistened by its own natural waters, is pleasant, it is good and natural mould; but if it be disagreeable, it is a sign that the ground contains some noxious mineral, or other evil quality,

which is inimical to vegetation.

It has been the opinion of some, that the earth of itself consists only of a sandy dry substance, fit merely to give stability to the stem, and embrace, as it were, the first rudiments of plants. But since it is fo hard, as has before been observed, to obtain any of the elements pure, so it would lead into a disquisition of little use in practical husbandry, to investigate this matter minutely. I shall therefore only observe, That as it is apparent that most of the unctuous qualities we perceive in the earth, arife from putrid animal and vegetable substances mixed with it, so these substances and others which partake of their nature, as being fitted for fermentation, are generally most useful in manure, where to enrich an impoverished land is what the farmer would aim at.

It has been the opinion of some ingenious writers on the subject, that were falt-petre to be obtained in plenty, we should need little other compost to manure our ground:—when it is considered, that nitre or salt-petre is formed from a calcarious earth, mixed with putrid substances: the validity of the maxims above delivered will not need to be called in question.

And on this principle the rule I laid down, relative to the preference that should be given to black mould, &c. will be best understood, since that fort of soil is the proper one, as being fat, loose, and crumbling; this always requires the least labour, and yields the greatest profit, as it is in the state nearest to that which is required for cultivation.

Besides all animal and vegetable substances which gradually decay, the fossile substances, either in their natural state, or as altered by fire, are useful in manure. Marle, chalk, sand, shells, and lime itself, of which I shall here speak more fully.

When lime-stone and chalk are burned into lime, the kiln most generally used for this purpose, is a C 2 large

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large round pit, of a fize proportioned to the quantities intended to be burnt in it, being wide at the top and narrower as it descends. The infide is often built with lime-stone, but a brick wall is a more proper lining to it. At the outfide, near the bottom, is an aperture whereby to take out the ashes; and above this, some have an iron grate which comes close to the wall; others make an arch with stone, or large pieces of chalk, over which they place a layer of whatever is to be burned in the kiln, over that a layer of fuel, and fo on, till the kiln is full, observing that a layer of fuel should always be the outermost. When the kiln is thus filled, fire should be put at the hole underneath, and the operation will be finished in different time, according to the substance that is to be reduced.-That which is made of chalk is generally burnt in the space of twenty-four hours; but that made of stone will sometimes take up fixty. Ten bushels of sea coal, or one hundred of faggots three feet long, will burn forty bushels of chalk, and these will produce thirty of unslaked lime. Where chalk is scarce, the chalk rubbish is worked up into a paste, then made into a fort of bricks which are dried in the air, and afterwards burned into lime in the fame manner as the chalk stone, but this method proves more troublesome, and far less profitable than the other, for which reason it is only used as matter of necessity.

Besides, this common way of constructing kilns, there are others which have been adopted by various perions—Amongst these, that of constructing them in the shape of an hogshead, small at the top and bottom, and wider towards the middle, is apparently the best calculated for the purpose. This sort of kiln should be made entirely within the surface of the ground, on the declivity of a little hill, so as to allow free access to the air-hole. At the

bottom.

bottom, at the distance of about a foot from the ground, should be placed iron bars horizontally across, in order to give the kiln a good draught, and upon these bars should be laid first either furze or small wood, afterwards small coals, then stones about the fize of an egg, afterwards another layer of fuel, and fo on, increasing the size of the stones towards the middle of the kiln, where they may be as big as half a peck, and again gradually decreafing their fize towards the top, observing at the fame time to lay the smallest next to the sides. The stones need not to be broken so small for this kiln as for those above ground, they will be burned. more truly without raw stones, or running into cinders, and not near the quantity of fuel will be confumed by this method of proceeding, as it is plain that a kiln swelling about the middle, must reverberate better, and produce a more strong and intense heat, than those which are constructed in the other manner.

They make lime of chalk, or of any stone that is not too cold and fandy, and the stones must be broken in pieces before they are thrown into the kiln, left the air contained in their cavities should cause them to burst, and damage it. Soft stones, which are rather of a close texture, will produce good lime, fo also will marble, fea-shells, and corals. Flints are likewise used for this purpose, but these are more difficult to be reduced into lime, except in a reverbatory furnace, on account of their propenfity to run to glass. The hard, firm, and white stones are reckoned to make the best lime, and when it is made from chalk, the hardest is preferable; though in these cases the hardest thones will always require the fiercest fire.

When stone time is burned in these kilns, vents are generally made near the bottom, to be opened occasion-

occasionally as the wind sits, in order that the draught of air may ferve to quicken the fire.

The most certain method of trying whether any particular fort of stone be proper for making lime, is to drop upon it either aqua fortis, or spirit of falt: those stones with which either of these effervesces, or rises in bubbles, will burn to lime; and the stronger the effervescence, the fitter they certainly are for the purpose.

In the use of lime thus burnt for the manure of lands, it is best laid on arable land, which has been fome years under grafs, so as to remain for a year, which it has been found to alter to a fine natural clover. If the ground be free and open, and you lime it in October, it may be plowed in the March following. In either way it so far improves the fward, that for three or four years the best of crops may be expected from it.

Mixing the lime with turf, and placing them on heaps in alternate layers for about the space of fix months, has been known to produce a manure fo rich and mellow, as to cherish and invigorate the foil, without the danger of burning, or too much exhausting the vegetative virtue, which is the only inconvenience that can be apprehended from the use of lime alone. For the same reason likewise it is greatly meliorated, and being mixed with dung, or the mud drawn from the bottoms of ponds and rivers, and in this case fails not remarkably to fatten and enrich the foil.

It is generally thought, that lime makes corn grow with a thin hufk. It is a great destroyer of moss and rushes after slaking, and quick-lime is the same to the remains of furzes, after the bushes have been grubbed up. However, as it is apt to overburn dry foils, it should never be used upon them but with the greatest caution.

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Chalk is likewise an excellent manure for such lands as it agrees with: but this is best to be dug not in summer, as is the practice of many, lest before it is laid on in the winter, it should harden into lumps; but from November to February will be found the best season for digging it. It should never be plowed in too soon, or too deep, but should be lest to moulder upon the earth; but the sooner it is spread, the more will be perceived of its effects.

This manure changes the very nature of the land, but it is rather too apt to exhaust it, on which account it requires dunging to keep it afterwards in vigour; so that a second chalking is not likely to prove beneficial to those soils with which a first has succeeded, unless they have lain a long time to recover themselves; for which reason, it will be adviseable to mix it with earth, mud, or dung, about one load of the former to two or three of the latter, which is a method that may make the advantages drawn from it both more certain and more lasting, especially if it be mixed with dung, and laid by for two or three years.

The common method of chalking lands, is to lay from twelve to fourteen loads of chalk upon every acre. This makes corn yield well, and when laid upon pasture ground it makes the grass both sweet and rich, feeds the cattle in such a manner as soon to fatten them, and makes the cows give the best of milk, which of itself is an article that deserves attention. Some farmers are so fond of chalk, that it seems to be their opinion that the land will produce nothing without it; nay, there are landlords, as we are assured, who will pay their tenants for the chalk they lay upon their grounds, by giving them some years rent on condition of properly chalking them. However, unless people are careful what forts of chalk are used, it does

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not appear that this way of proceeding can answer. That chalk is particularly an improver of light and hot grounds, is the chief result of my observations upon it; and in these cases its good qualities are

most apparent.

Whether stones are serviceable or hurtful to arable lands, is a question which has been long in difpute: at least it is rational to suppose, that none should be left large enough to interrupt the operation of the plough. As to the leaving small ones, fome fields which abound in them have proved very fruitful, and some from whence they have been taken have ever afterwards proved barren.— One cause assigned for this is, that they preserve the earth from heats and colds, which indeed is more than probable; but there is yet another, which is that of a virtue in certain stones, which tends not only to the covering and protecting, but also to the fertilizing of the earth, as some experiments which I have feen made feem to argue: however, as none of these were determinate enough for me to deliver an absolute opinion of the matter, I shall mention a foreign one, and leave the result of them to speak for itself; it is on the authority of M. du Hamel, whose own words I shall quote upon the occasion.

"The stone which is used for building at Denainvilliers (says he) is very hard; it bears a polish like marble, and is here and there intermixed with shells, some of which are filled with a kind of ochre, and others contain a fort of crystalline substance. This stone is very fit to make lime of. Some workmen who were building about our house, cut pieces of this stone upon a grass plat; when they had finished their work, the rubbish was cleared away, except the dust which alone was lest upon the grass, together with small fragments which had fallen from the stones in cutting them.

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Next year the grass grew surprizingly thick in all the places where these stones had been cut, was much taller and greener than any where elfe, and preserved its vigour for several years. One would scarcely have thought, that so hard a stone reduced to powder, would have produced an effect like that of marle. The goodness of lime as a manure, is, perhaps, chiefly owing to the fineness of the powder, to which the lime-stones are reduced by calci-

nation.

"This fact (continues he) may help to clear up another, which cannot have escaped the notice of those who attend to the differences of soils .---They must have observed some grounds so plentifully covered with stones, that little else is to be feen after a hard shower of rain; yet these are very fertile lands, and produce fine wheat. I know not whether I am under a mistake, but I think that this fertility is found only in fields where those stones are calcarious; and it is very probable, that the dust which is formed by their rubbing together, contributes to their fertility."-

As even marle itself has somewhat of a stony appearance, this conjecture, founded likewise on the experience of what M. du Hamel was an eyewitness of, ought not to be slighted .-- For my own part, I am no friend to mere speculation in matters which relate to agriculture, but where these may be of use to the practical part, I shall always notice them in the course of this work. If this be the case, the farmer may try the nature of the stones by aqua fortis, or spirit of falt, as in the case of lime-stone, has already been prescribed.

The ashes which are made from any kind of fosfils are likewife useful .-- Turf and peat ashes are extremely rich, which are, perhaps, meliorated by being mingled with lime before they are laid upon

the foil.

The earth from whence this manure is made, is taken from a black, moorish ground, such as I have already given a description of, and is taken out with a wooden fcoop, which brings it up fomewhat in the shape of a long brick. These pieces are dried in the ground in fummer time for fuel! but if, instead of this, they are to be used for manure, after being dried they are to be burned, being laid in heaps of ten, twenty, or even thirty loads, laying on more peat on the outfides, as the fire within increases, to keep it from having too much vent. Some persons having used these ashes imprudently, it brought them into great difrepute; but this was owing to the want of judgment of those who laid on too much of them at a time. by which practice their corn was burnt. It was afterwards found, that from fix to ten bushels was a fufficient quantity to be fown over an acre of wheat, peafe, turnips, clover, rape-feed, or fainfoin, and that as early as could be done; but it has generally been thought more hazardous to use them with barley, as they contain such sulphureous particles as might burn it up in case of a very dry feason. These ashes, however, are serviceable in keeping off the flug from peafe and other grain, on account of their falt and fulphur; and there is no danger of over-heating in the ashes of that peat which grows as turf over fandy bottoms: thefe and fea-coal ashes are great destroyers of moss and rushes, which in some cases must add to their value.

Sea-salt, which comes next under our consideration: this, as being attractive of moisture, seems to be of use on dry soils, where it will keep its moisture; though in its native state it is rather likely to retard than serve vegetation. Its bad effect is likewise generally likely to be where it has

to deal with putrefaction, which renders the ma-

A bushel of salt being sowed on a piece of ground in the neighbourhood of London, it grew fresher, greener, and of a thicker sward than the rest of the field, which, though on account of the price of the salt it could not answer, yet served to shew its nature, and thus proved what was sought for by the experiment.

Upon a clayey soil, sea-salt has often been found to be beneficial, the acid of the clay being attracted by the properties of the calcarious earth, by which means the vitriolic acid is neutralised, and the body

of the clay made more fit for vegetation.

Soap-ashes, the refuse of the soap-boilers, may also prove a good manure for sour and cold lands. A very bad soil, over-run with broom and surze, having been thus manured, is said to have produced great crops of corn for several years successively. The general allowance is eight loads to an acre. The ashes of sea-weeds have likewise proved very advantageous for the same purpose.

Soot also, whether produced from vegetables or from coals, is much used for manure both for corn and grass. It succeeds best upon moist grounds, and upon such as are over-run with moss. It is generally esteemed likewise as proper to be sown over young turnips, almost as soon as they have appeared, though it should not be strewn too thick, for fear its hot nature should be hurtful.— Charcoal dust, when it can be procured, will always be useful, and may be used in the same way as soot and wood ashes generally are.

Among the vegetable manures which are useful to most soils, lupines cut down and turned in while green, will have an effect similar to that of dunging, and may therefore be used to advantage.—Peas, beans, vetches, and other succulent plants,

grounds; but in strong lands they should not be turned down till the pods begin to harden.

The best time for plowing in buck-wheat, and vetches for manure, is when they are in bloom. Some farmers turn down their second crop of clover, to enrich the land for the wheat in autumn; but this may hurt the corn instead of serving it, if it be not done early enough to give the plants sufficient time to putrefy before the grain is put into

the ground.

The weeds of ponds and ditches may be used also; but wherever people have recourse to these weeds, they should observe to cut them down as foon as they flower, left the feeds of them, if they be ripe, should fill the lands with weeds, which would occasion much inconvenience; besides, these are more full of falts, than when they are fuffered to fland till they are farther advanced towards maturity. In order to rot these vegetables, earth, mud, or fome substances of a similar nature, should be mixed with them, partly to hinder them from taking fire in their fermentation, which otherwise might be likely to happen. When these are thoroughly rotted, they will form a mais somewhat resembling butter, which is a proof (as I have faid before) of its being proper to furnish a rich and fruitful mould, for which already it is so well prepared.

The tanners bark, when rotten, is justly recommended by many who are experienced in agriculture. The bark of all trees, and particularly that of oak, contains a falt very useful for the purposes of vegetation: and after the bark of oak has been used by the tanners, it is of excellent service to cold, sour soils, as has been often experienced; and if mixed with other manure, in a proper proportion, may be used for almost any kind of land,

as there are few foils which it has not the power to turn into a fine, rich, black, crumbling mould. When this is to be laid upon grafs, in order for the rain to wash and fink it into the ground, there is no wonder this fertilifing quality should exist in it, fince, besides its own proper vegetable virtues, it is impregnated with animal juices from the bides &c. with which it has so long lain in the tanners vats. In using it for corn land, it should be spread before the last plowing, that it may be turned down, in order that the fibres of the corn may more conveniently reach it; when it lies too near the furface, it is apt to put the corn forward in winter, in fuch a manner, that when fpring comes, at which time the most nourishment is required, its virtue will be nearly confumed.

The lees of wine, and the grounds and settlings of ale and beer, are likewise good. The cakes of linseed, rape-seed, &c. after the oil is squeezed out of them, being ground to powder, strewed on the ground, and plowed in, prove excellent manufer they help to bring up luxuriant crops, which are so vigorous, that the very heart of the ground is destroyed: however, if it be mixed with fine earth or sand, that method, by taking off its too great strength, may remove the desect. Malt-dust, and dyer's dung, have also been used to advantage.

It is worth remarking, (as an ingenious foreign author has observed) that crustaceous liverworts are the first foundation of vegetation, and therefore may be reckoned as plants of the utmost consequence in the economy of Nature, though generally despised.—When rocks emerge out of the sea, they are so polished by the force of the waves, that scarcely any herb can find a fixed habitation upon them; yet the very minute crustaceous liverworts begin to cover these dry rocks, although they have no other nourishment but that small quantity of mould and imperceptible particles, which the rain

and air bring thither. Those liverworts dying, at last turn into a very fine earth, and on this earth another fort, called the imbricated liverworts, spring up, striking their roots deeply into it. When these two die, the various kinds of mosses find a place, and being removed by the same economy of Nature, a depth of mould at last is formed which is sufficient for herbs and shrubs to live

upon.

The same author observes, that when trees are cut down or overthrown, in order that they may not remain useless to the world, and lie as melancholy spectacles, Nature hastens their destruction in a fingular way. And first, the liverworts begin to strike their roots into them, afterwards the moisture is drawn out of them, when putrefaction follows. Then the mushroom kinds find a fit place for nourishment there, whereby they corrupt them still more. The beetle next makes himself a way between the bark and the wood, and, together with the caterpillar, bore innumerable holes through the trunk; and afterwards the wood-peckers coming thither to feek for infects, wear the tree away till at length the whole passes into earth; such industry does Nature use to destroy it. Indeed those trees which are immerfed in water would scarcely ever meet their destruction, were it not for the efforts of those worms which also destroy the bottoms of ships, as the failors know by fad experience.

Thistles, which are certainly very useful plants, are guarded as it were by Nature. If you have a heap of clay, on which for many years no plant has sprung up, let the thistles grow there, they will thrive, and by their leaves will attract the moisture of the air, at the same time they afford a shade. By this method even these have their use; for by proper management of them, you may thus con-

trive that numbers of other plants will cover the

ground.

As to animal manures, they are all exceeding rich and excellent; and there have been instances of lands where battles have been fought being actually enriched by the blood of the flain. The blood and flesh of animals, if not applied too crude, is esteemed by judges of agriculture, and proved by experience, to be more enriching than their dung. Hair, wool, and bones, may likewise be ranked in And as to coarfer foils, the dung of this class. poultry (fome kinds of which are not in esteem) has often been found to exceed that of beafts. The bottom, offal, shakings of corn-ricks, and haystacks, when mingled with blood and foot, till brought to the confistence of a paste, with as much dried neat's dung tempered with urine, will form a good compost. This should be made up in cakes about the fize of houshold loaves, well dried in the shade, and, when crumbled to dust, should not be laid on thick, but sprinkled over the land. Corn especially is apt to be over-heated by it. Pigeons dung is apt in particular to burn feeds on a hot ground; when on a cold one, it has been found excellent for barley.

As to bones in general, which I mentioned above, they are best when broken into small pieces; and the hoofs of cattle may be used, if upright in the earth, in order that by the rain they may be putrished, and afterwards washed out by successive showers, all which fails not to fertilize the soil.

Fish is a manure used in some light soils to great advantage; though ill effects have been sound from it in hot climates, or sultry weather, where it has failed to decay and be converted to earth quick enough. In such places this may serve as an objection to it. It has been said that the mere sweepings of places where they worked in whale-bone,

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has produced good and lasting effects. This is a fort of manure which is in this last respect preferable, as not being subject to the same objections with the former.

Woollen rags, and the nippings of the pitch-marks upon sheep have been likewise recommended. In this case, the rags should be chopped small, and scattered upon the earth at the second plowing, in order that they may begin to rot by seed time. These imbibe the rains and dews, and keep loose soils in a moist state. Allowing four sacks of six bushels each, to the acre, they may be laid even on stiff lands just after the sowing of the corn.—

The intent of dungs is either to cure the particular defects of different foils, or to repair them when they are exhausted. For this reason, to cold, moist, and heavy lands, the dung of poultry and of horses is best used; while to lean, dry, light earths, that of oxen, cows and hogs is proper to be applied. Without this kind of discrimination, dung can be of little service, nay it may even

The least fat of these dungs, and by far the hottest, is horse dung, if taken as it falls; the best
way therefore is to lay it (not spread on the grounds
exposed to the wind and sun, as is the manner of
some; for then it exhausts its virtue) but in heaps,
mixed with earth, and lest till it rots. If cow dung
and horse dung be joined, and thus tempered, a
better effect may be expected from the mixture
than from either of them in a separate state; in
particular it will produce grass not so rank, and
much sweeter for the pasture of cattle.

Sheeps dung and deers dung are best used for cold clayey soils, and the most eligible method of obtaining it is that of folding the sheep upon the land you intend thus to dress, whereby their urine also is preserved. The whole ought to be turned

in with the plough, as foon as possible, that it may not be exposed to the sun. Good crops of rye have been obtained from lands formerly esteemed barren, on account of their becoming warrens, and being well dunged by rabbits, and large oak and ash upon the same, though the soil was very shallow, which is a matter somewhat remarkable.

Swines dung has been imagined by fome to breed more weeds than any other fort of dung; but this like many others of the like fort has most probably arisen from injudicious persons laying it on too thick, as is commonly the case. Indeed most forts of dung are apt to produce weeds if used too plentifully, as the vegetables the animal has eaten are feldom fo thoroughly digefted, but that fome feeds of them remain, sufficient to give occafion for fuch a produce. It is generally best to carry this manure immediately from the flye to the field where it will ferve for raifing either corn or grass; but more especially the latter. fands and gravel receive the greatest benefit from it, and it is reckoned exceedingly good for rendering trees fruitful. Those who prefer this dung have their hog yards well paled in, and paved with pebbles or chalk; it is also common to increase its quantity by throwing in all the refuse of the garden to rot amongst it. These methods have been used so as to increase the dung to such a degree, w that ten or twelve swine have yielded fixty or eighty loads of manure in the space of a year.

A small white species of pease is sown by some farmers upon poor, light, and shallow land, which is never intended to be reaped; but as many hogs as they think this crop will fatten, are turned in to eat them, and to lie upon the ground day and night, that their dung and urine may enrich and fatten it, which makes a thick sward, and for se-

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veral years afterwards the foil will be good grazing

ground.

With the fame view, likewife, it may not be amis where this is not done, to sow ten or fifteen acres with turnip feed, a little before they fow clover, which is best done in September; and about the beginning of March, to place there three hundred fows, fuch as will farrow in a month. In the most convenient parts of the clover-ground little styes of boughs or reeds should be made for them, either in the corners or under the hedges of these fields. The sows should at this time be kept up, and fed with the turnips boiling them at first, in a little time they need only to be scalded, and at length the fows will eat them raw. They should have them tops and all; after they have farrowed, which may be supposed by this computation to be about the middle of April: having farrowed, they must not be fed with turnips any longer than till the clover is high enough, that they and their pigs may be turned in together. The fows will most eafily graze upon it, and the pigs, as foon as they have left off fucking, will take to it likewife, which will greatly accelerate their growth and fattening. Large cattle are apt by their tread to break down grass, but this is not to be apprehended from swine; and should it be feared that they might root up the ground, a ring put through their nofes in the usual manner would be a fecurity against that evil.

For cold, four foils, human ordure is reckoned beneficial on account of its heat, and the falts with which it abounds; it should be mixed with other kind of dung, straw, or earth;—but the ill smell, and some other inconveniences of the like nature, occasion many to disapprove of it; notwithstanding, it is used in several places abroad, as well as about London, to advantage;—however, being a hot

hot manure, care should be taken not to lay it on

either too new, or in great quantities.

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Urine is commended for being useful in promoting the fruitfulness of trees; and the Dutch are faid to preserve the urine of their cows as carefully as they do their dung, in order to enrich the lands. In effect, urine seems to be of more service to lands than is generally imagined by farmers, who would do well to preserve it when they have a convenience, so as at least to try the experiment.

Goose dung is a kind of manure which is generally very much difesteemed, and thought to render grounds barren; but if we may believe those who have tried it on purpose, it has in reality no fuch property, though it is of fo hot a nature that if too much be used, it may so far be hurtful. There is an instance of a field given to the inhabitants of Sutton in Nottinghamshire for feeding geese, which by their dung was made one of the richest pastures in those parts; nor did it appear that the cattle which fed eagerly upon it received the least injury. Horses kept in a piece of ground where geefe lay very much, ate the grafs bareft where those birds had dunged most; and it was never known to hurt them, but on the contrary made them very fat. A flock of wild geese pitching on a parcel of green wheat, rested there several nights till they had eaten up all the blades, but in by return dunged the land fo effectually that the wheat fprang up again with double vigour, and produced a much richer crop than any of the neighbouring fields.

It is the custom of farmers when they collect manures to lay them altogether upon a dunghill, where they remain exposed to the weather, but as this is a practice which must certainly exhaust their virtue, it would be well if they would always keep these composts in a place contrived so as to pre-

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vent this inconvenience, which might be done in

the following manner.

Let an oblong pit be dug, of a fize proportioned to the compost wanted. Let the fide next the fields be made floping fo as eafily to receive a cart to load or unload. The bottom should be well paved and the fides lined, (unless it be made in a bed of clay or chalk) that it may be capable of retaining water, as it is proper that the dung should be well foaked in liquor, which will prevent the vegetation of the feeds of weeds that may by chance be mixed with it. Care should be taken to make the pit, however, in a place where the extremes of wet may be avoided, where no runing water or fprings can come to it, and a coat of mould should constantly be put upon the compost as collected. A shade must also be ready to put over it in case of a very wet season, though, as to gentle rains, they will do it more good than harm, in bringing it to that state of fermentation which is necessary for forming a good compost.

The stercorary being prepared, the next care is to fill it with fuch a kind of compost as may best fuit the land. If the foil be a strong clay, a layer of dung should be covered with a layer of rubbish from old houses or some such other substance as I have already recommended for meliorating clay. Litter of all kinds may likewise be added, as being flow of decay, and, when mixed with clay, very useful in the separation of its parts. This may be carried out, mixed with the earth fresher than for any other foil, because if some degree of its fermentation continues in the foil, it will be more powerful in its effect as to the opening it. But if the foil be fand, then the dung should be mingled with clay, the scouring of ponds, or other fat and flimy substances, as has already been ob-If it be a middling foil, which is subject

to neither of these extremes, then a mixture of the richest mould will be sufficient, and most advan-

tageous for the farmer.

The mixture of lime with these composts, after they are thoroughly rotted, will produce many good effects, among which may be reckoned that of hindering the oils from being volatilifed: but as quick-lime is too much disposed to resist putrefaction, it must not be mixed in dunghills where the matter is not fufficiently fermented, left it

should prevent the necessary fermentation.

Lime intimately unites itself with all expressed oils: it must therefore necessarily attract the oils powerfully from the air and earth, and prove a medium proper for facilitating their mixture with water. On this account, if that quality be not corrected, it will be apt too much to impoverish almost any soil; but when properly mixed with dung, or other animal fubstances, it will have fomething to act on, whereby the ill effect may be avoided.

There is an excellent kind of compost recommended for a fandy foil, which I have known to be tried with fuccefs, and which has been recommended by a public fociety in Scotland -It is this-

In the field you would manure, take a headridge the most conveniently situated for a stercorary; plow it two or three times very deep in the cleaving way, if the ridge be high gathered; and harrow it well; then lay on it your flimy clay about a foot thick, leaving a part of the ground uncovered; next put a thin layer of dung, another of clay, and after that a layer of unflaked lime, at least a foot thick; then throw up the earth left uncovered on each fide. After this, repeat another layer of clay and lime-stone, as before, and finish it with a layer of clay and fea-wreck, (if to be had) covered

covered with earth. The slimy clay, though cold, will not prove the worse for such a ground; indeed, this species of clay appears to be a very fat substance, being often shells mixed with earth, and washed away by the tides; wherever this is the

case, such a manure must prove beneficial.

For fix weeks, or two months, this stercorary should stand incorporating and fermenting; then use your plough, and enter it with a cleaving furrow, repeating the plowing till the very bottom of it be turned up: then harrow it, and if it should prove cloddy, it should be harrowed between the plowings. Begin then in the middle, and plow again, until you have brought it into as narrow bounds, and raised it as high as possible: then all that the plough has left should be gathered up, and thrown on the top with shovels. Each of these turnings occasioning a new fermentation, improves the land. If the feeds of barley, or any other quick growing vegetable, were fprinkled thin on the stercorary, and the plants buried in it when full of fap, and before they come to feed, with turning, and more heaping, the foil would be improved.

Great care ought to be taken with regard to the proper preparation of mixed dung, for the more in quantity, and the better in quality this is, the richer will the crop prove, as likewise the richness of the crop itself will increase the quantity of the dung. The rise or fall of many farms in Great-Britain, (as has been justly observed) depends

chiefly upon this article.

But how to contrive to get together a sufficient quantity of dung, or proper compost, is a question which the farmer may ask.—I shall answer it by some plain directions, which have been given by a celebrated writer on the subject of agriculture, and which which I have myself known to be followed with fuccess.

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By the middle of November husbandmen should cleanse all the yards, &c. belonging to the farm- quanto house, lay them smooth, and if it be necessary, dig away a little of their furface till it is lowered about If they have any common or waste land, then fern, thiftles, and other weeds cut down when full of fap, should be brought, and a bed of them about two inches thick laid upon the place thus prepared.—But if weeds cannot be got, which is feldom the case, coarse wheat or rye-straw may be used instead of them; but the beds should not, in this latter case, be more than half as thick. A layer of earth, about fix inches deep, must be ipread upon this bed: any earth which the farmer will dig as near to the house as he can, is preferable to the method of paring off the upper foil, or turf, of common or wafte land to mix with the manure; because when such land has lost its surface, it will long remain entirely barren.

The litter and earth thus formed into a bed should be suffered to lie about a fortnight, during which time all filth of the kitchen and house should be thrown upon it, that nothing may be loft. The passage of men, cattle, and carriages, over this bed, and the feafon of the year, all will contribute to rot it. If the cattle (to complete it) are driven backward and forward upon it after rain has fallen, " this will foon make it a coarfe mud mixed with litter, which may be cleared away at pleafure; it will be best to do so at the end of a fortnight: then the same may be repeated; and by these methods, two supplies of this kind of artificial dung may be had every month during the winter feafon. this work will not be expensive, as it will be done at a time when labourers are least employed, and

as women and children may affift at it.

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But as this new made dung will scarcely be sufficiently rotted for use by the next sowing season, it will be best to lay it in a separate pit to mellow till next year, or even for two years, if it will so suit the convenience of the farmer. The other dung, which is more advanced in putrefaction, should remain about six months in the pit, and now and then should be wetted. In this interval it heats, ferments, and acquires a highly fertilising

quality.

Dung, which confifts of animal and vegetable fubstances, operates two ways upon the earth; the one is by conveying nourishment to the plants which grow in it, the other by opening its pores and separating its parts, till at last the whole together forms a fine black mould, fittest for the purposes of vegetation. And the best way, as I have said, to get plenty of this useful matter, is, by admitting proper mixtures of straw, litter, &c. without which there is seldom an opportunity of having a sufficiency of it; for which reason I have been the more particular in regard to the manner of making artificial dung, as it is generally called, which is of such service in the affairs of husbandry.

It is worth our observation likewise, that Nature herself has formed an excellent compost, in some places ready prepared, which consists of the putrid particles of animal and vegetable substances, mixed with the finest and richest mould, in those scourings of ponds and ditches, and of the creeks of the sea, of which we have occasionally made mention.

This is a manure fit for every foil, but more especially the light and dry: but, however (such in particular as comes from ditches) like some other artificial composts, should be exposed to the air, so that the seeds of weeds contained in it may putrety: they should either be kept a year or two;

or if wanted for more immediate use, should be mixed with dung or lime, to render them more easy of admixture with the soil on which they are to be laid.

There is a particular mud, or fludge, which by fome is called fnag-greet, of which it is generally admitted, that one load will go as far as three of the best horse, or cow dung. This generally lies in deep rivers, is very foft, and is supposed to be mixed with fnails and shells, to which it owes its fatness. All stagnating waters, or rivers which do not flow quick, abound in a very rich kind of mud, which confifts mostly of the foil of pasturefields, commons, roads, streets, &c. washed down till it finds a place to fettle in; and as it costs nothing more than the labour of taking it away, it will amply recompense those who use it, and save them much trouble and expence which otherwise they might be put to, in order to procure a proper manure for their lands.

CHAP. III.

Of the Plowing, Sowing, and farther Proceeding, with newly cultivated Lands.

WHEN the grounds have been properly cleared, and the wood burned off from them, about a fortnight after the usual feed time for wheat and rye, it will be proper to sow this burnt ground. That being done, it would be proper to send a number of women and children into the field with wooden shovels, to spread the ashes equally over the ground wherever they are wanted: some of these should carry iron forks, in order to break and spread such turfs as may not have been thoroughly

confumed: and directly afterwards the corn should be sowed over these ashes, in about half the quantity generally used for other grounds. The sower should be followed by the ploughman with his team; but this first year he should make but shallow surrows, going and returning, in order to cover the seed. Women and children, with hoes and iron forks, being still employed to break the clods, and to close the tops of the ridges, which the plough cannot do at the first plowing with the greatest exactness.

In this case there should be a sower before each plough, on account of the peculiar difficulty which will be found in sowing the land with only half the usual quantity of seed, and the plowman should proceed slowly, and with the utmost caution, in this his first tillage; and if any stones or roots should stop the plough, the other persons within call should be ready immediately to take them up, by which means they will clear their work as they proceed.

Drains should be made as soon as the seed is sown and covered, cut with the same plough, either directly across the surrows, or aslant them, according to the declivity of the ground, so as that they may empty themselves into the main ditches, which should always be made previously, and prepared properly to receive their contents. Some of those who are employed in breaking the clods, may occasionally deepen these drains with an instrument shaped like a hoe, with a strong, slat, iron spike, about eighteen inches long on each side of it.

The corn which springs from this ground will be thin at its first rising, because the warmth of the ashes will contribute to prevent any weeds from coming up with it; but at last it will grow very thick, and generally ripens before any other corn in the country. It often happens, that finer corn grows in those places where the turfs have burned but flowly, and some of them have remained in entire clods, than where they were totally burnt and converted into ashes. And besides the different effect the fire takes in burning, and the quality, and even colour of the ashes, are matters of consequence; for where white ashes are produced, those spots are less valuable: the more they seem calcined the better, but when they have the least appearance of petrification, they are always the worse for it.

The women and children who are employed in this work, should be provided with baskets, in order that they may pick up such stones as obstruct the plough. If larger than they can thus remove, they may be taken away by carts; but if of an enormous size, they must then either be broken with iron tools, or blown up with gunpowder.

As to the fort of grain which is the most proper for the first year's sowing in these newly cultivated grounds, the quality of the soil will best guide the farmer in determining upon it. If the soil should prove rich, it will bear wheat; if of a middling quality, messin; that is, a mixture of rye and wheat; but if poor, it will probably bring up rye alone. And, for the generality, it may be best to sow this latter grain at first, being most certain of success; and besides, by its plowing and produce, he will be the more capable of judging what it may bear the next year, and consequently will run the less hazard.

The ground thus fowed, ripening its grain sooner than other lands, will be so much the sooner reaped. The difference, in point of time, will generally be found to be about a fortnight, which will afford the more time for plowing, and besides put it in the power of the husbandman to find labourers

more easily, and at a less expence, than at the time when they will be sure of a full employment.

After the reaping, a slight plowing should be given to the land, in order to bury the stubble. A few days after that, it should be plowed deeper in the same direction, and when this is done, two cross-plowings should be given it, to a depth proper for sowing; and lastly, it should be plowed a sifth time, to leave the furrows in their proper direction: and between these plowings, the ground should be several times well harrowed. The effect of all this will be the pulverising the earth, and mixing it equally with the ashes.

The second year these new grounds will not require so many hands to break the clods; and a little more seed may then be sown in proportion to the extent of ground, though still not so much as

is used with other lands.

As to manures, these new soils thus broken with the plough, at this time will not require any. And these crops of corn while they exhaust, will by no means hurt them, in case of their being afterwards intended to be turned into wood-land. crop will not be the best, as the ground will not be brought to a sufficient degree of culture; but almost the whole of the second will prove clear gain. The third, and the subsequent ones, will be good, should the soil be able to bear more. If it is afterwards to be fowed for a wood, in the last year of plowing, chefnuts, acorns, beech-mast, &c. may be fowed with the corn, in which case the teapers must take care that they cut the corn high at harvest, lest the young plants should otherwise be damaged. But if this land is meant always to produce corn, and is not fufficiently enriched by ashes, then it will be proper to manure it the second year, before it is fown as above directed; and the best manure that can be used in this case,

is the artificial compost which I have already so minutely described. The fourth year it will be expedient to lay on the same quantity of this compost as in the second, which must be proportioned to the nature, the richness, or poverty of the soil; and then it is probable, that two plentiful crops more will repay the farmer for his toil. At the end of sive years it will be best that these lands should rest; and afterwards, if still continued for the culture of grain, they should be treated like other arable lands, and will generally be found to differ from them in nothing, except in producing better

crops if properly treated.

This manner of proceeding has even fometimes had fuch an effect, as to be experienced for eighteen or twenty years, from the lands which have received the kind of tillage I have mentioned. The chief reason of this is, that scarcely any weeds in this case will spring up, so that none of the moisture of the ground will be wasted; thus the corn is more full eared and vigorous, as well as the expence of weeding faved. When the grain is thrashed out, it generally proves so clean as to need only winnowing; and the bread, by experiment, has been proved to be peculiarly sweet and wholefome; and it is only when these lands, by time, are reduced to the same condition as others, that they will have the same defects; but (as it has been justly observed) it will be long before this change, and, in the mean time, the profit is fo great, that he who undertakes the clearing of fuch ground, needs not doubt of being most amply recompensed.

Besides, when this happens, the soil may yet be restored to its former vigour, by letting it rest for two or three years; then it follows, that a sward will grow upon them, which being burned off as before, the farmer may proceed in the same manner as before, without so much expence, as there

will be only the turf to be pared off, no roots to grub up, nor stones to carry away; and the clods to break will not be so many in number.—Wornout meadows may be restored by the same means, and being sowed again with grass-seeds will yield

very good hay.

When clayey foils, and fuch as stick to the feet when trod on, have been cleared, (which besides taking care to free them from water, stones, and great roots, necessarily includes paring, and the methods already mentioned) wheat may likewise be sowed upon them the first year, in such places as are rich enough to bear this grain; in others, meslin or rye, according to the strength of the soil. The ground is afterwards to be manured, plowed,

and fowed, as has been already directed.

But it sometimes happens, that lands of this kind have so few weeds, that it is not possible to take off sods that will burn. These must be dug and broken in the spring with the spade and pick-axe, and left to dry for about the space of six weeks; after which, iron and wooden rakes must be used to break the tursy clods, and to shake the mould from their roots.—These roots are to be well dried in the sun, and then laid in heaps from space to space, where they must be burnt; and their ashes, after being spread with shovels, should be plowed in as soon as can be, with a proper plough for the purpose, during the sultry season of the year, cross-ways, slanting, and in every other direction.

This land will be best sown at the season proper for sowing other lands; but neither wheat, meslin, nor even rye, are likely to grow upon it for the first year.

Not having been burnt, its fourness still remains, nor are the seeds of the weeds killed in it, which rising up will choak the springing corn,

and much retard its progress; while worms, and other infects, will be ever ready to deftroy that, and

every other production.

Oats have been found by experience to be the best grain that can be fown upon this foil, because they are more fitted for overcoming all these difficulties, and preparing the foil for another crop,

which may prove more profitable.

The oats being cut, the ground should be plowed, and cross-plowed several ways and often, in order to loosen it; afterwards it should be manured either with the compost I have mentioned, or, in defect of that, with common dung. But if it grows hard, and cracks, fand should be laid on it: and when all this is done, the fecond year the ground may be fown either with wheat or meslin, according to its goodness. The following year it may be fown with the same grain, and without any manure. It should then lie fallow for a year, and after that it may be tilled in the common manner; but it must not be expected ever to arrive at the same perfection with burnt lands, that have fo many advantages which this never can be endowed with. The first crops from this ground are never so confiderable, nor can they, generally speaking, in any future period of time be brought to fuch a degree of fertility, as those which the fire has cleansed.— In effect, this is a cheaper way of tillage, but in the end is not nearly fo profitable as that which I first mentioned.

Some have thought, that breaking lands up with the plough, without either of these methods, and fowing upon them directly, might answer the wished-for end; for my own part I must say, that every experiment of this kind which I have feen tried, has proved unfatisfactory. But if people are resolved to follow their own practice, this must be done where there are very few weeds, or wild

plants. In this case, the first plowing must be given in the beginning of the Spring at farthest: the second plowing should follow almost immediately, and across the former plowings in different directions must afterwards be used during the heats of summer, to destroy the weeds; and after all this is done, the ground so greatly harrassed, and the plough often broken in its operations, nothing but oats can be sown with any prospect of success; still the seeds of grass and weeds will shoot up, and the bringing the soil into proper order will be the work of years. On the whole, therefore, this is the worst method a person of economy can take with his lands, while any other offers.

The grounds which have thus been fertilifed, ought to be inclosed with care; and if they are of a considerable extent, to be surrounded with hedges and ditches. Fruit trees also may be planted at convenient distances, but care should be taken to do this in such a manner as not to impede the plough. As these improvements are enlarged, houses may be built, if the extent of ground requires them, and parceled out into farms; the very stones picked from the lands being of use in building these houses, where every thing may pro-

duce some advantage.

The farms thus parcelled out should by all means be as small as possible, since it is most certain, that the more an estate is divided the more it produces; and one of the greatest evils at this time complained of, the dearness of provisions, is most undoubtedly chiefly owing to the monopolising farms, which is one of the worst monopolises that can be encouraged in any country; since, in the first place, these large farms cannot subsist so many persons as a number of smaller ones would do; and secondly, the little farmers will breed an useful kind of live stock, and are obliged to send

their goods to market; whereas the great ones will do neither. This is a fubject which has often been handled, and amply discussed; and indeed it is a subject well worthy of every one's attention.

The method of proceeding with newly cultivated lands here mentioned, may be followed in any part of the world, allowing only for the difference of the feafons, which must be allowed to be a fingular

advantage.

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I have already fpoken of the draining bogs and marsh lands, in order for their producing grass and grain; but as there is another commodity which may be raised upon them, (I mean bops) and for the raising which the method must be varied, I shall here set down at length the manner in which the planter should proceed upon this occasion.

In the first place, dig a trench, of the width of feven or eight feet, round the spot intended for your hop ground, allowing it all the fall the land will bear. In cutting this trench, be careful to leave a piece of the bog uncut on each fide of the plat, as a passage in and out, with a channel bored in it for the water. It must be nine or ten feet wide, and the arched channel under it of sufficient height and breadth to let the water through. This being, in effect, a natural bridge, must have the same qualities with one. Two men thrusting their spades, or shovels, from each side till they meet, will perfect the work within a little time, and without much trouble.

At the lowest part of the trench, where the water is discharged, you should leave a bank about two feet high uncut, to keep it to that height in the whole furrounding drain. This will furnish you with a refervoir for the use of your hop yard in dry feafons, besides a cheap manure from the mud, which will be lodged at the bottom of the trench,

when the current is checked by the bank.

At the distance of about four feet from the inner edge of your furrounding ditch, and parallel to it, draw another infide trench of two feet in width, and the same in depth, in the manner of the former, round the ground, and by the line; then fill it up with proper foil, and plant fallies in it, or any other fort of aquatics, fit for poles. In about fix years they will be ready for the use of the hopyard: the earth about them will be kept sufficiently moift by the bog, and their roots will be preferred from winds and frosts, by the distance of their stand from the edge of the main drain. In order to forward their growth, the fide-shoots should be stripped off when tender, to prevent their running out into strong branches, and thereby impairing the body of the tree. The mud out of the trench should likewise be thrown upon their roots, and that will supply them with fresh nourishment. When the plants are two years old, is the best time for doing this; and in the fummer you should out the little bank which keeps the water in your trench, and leave the drain entirely dry; the mud at the bottom will then grow stiff, and may be thrown up for manure with very little difficulty.

The bog being thus inclosed, a line should be stretched, parallel to any one side of the inclosure, at the distance of about twenty feet from the trench. Tie rags or feathers to this line nine feet asunder, and when the line is stretched upon the ground, at each of these marks drive a sharp stick into the bog, to determine the centres of your hop-hills. When the first row is finished, remove the line to nine feet distance, and mark out a second, and so

on, till the whole plat is finished.

When the centres are thus regularly disposed, at the distance of nine feet from each other, you should dig a hole at each of them, three feet in width and the same in depth, to lay the upper fods of it in the hollow of the bog, and to make turf of the remaining soil. The turf must be wheeled out immediately, in order to be spread upon other ground, (if you intend to go on with your work this summer) lest it should hinder the progress of other parts of the business, especially the passage of the earth or compost you may have occasion for to fill up the holes, in order to receive the hop-sets which are to be planted here, and afterwards to be managed as in other places.

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Take off for this purpose in the upland that is nearest to the spot, with a hoe or other proper instrument, the sward of a small plat; burn it, and by thorough plowing, mix the ashes with the mould. Add to these a little lime, rotten dung, or rich garden mould; throwing this mixture into heaps where it may ferment, it will afford a rich compost. As to the carriage of this to the hop-ground, that will be esteemed by far the most expensive part of the whole; but if these directions are followed, the furface of the bog being no where broken, except just where the hops are planted, it will allow of a fafe paffage for cattle, and as the walks are fix feet wide, the hills being but nine over; these circumstances will, in some measure, lessen the charge; though in every foil the raising of hops proves expensive. Indeed, upon a just calculation, it will appear, that it is more fo in the most favourable upland fituations; because ditching and inclosing, in the first place, in effect, cost nothing in the bog, the turf made at the same time being of worth sufficient to counterbalance the charge.-Plowing, harrowing, fallowing, and digging, by this method may likewise be said to be saved; not to mention the additional articles of hoeing and paring the uplands - There is no wonder that this should be fo, as the reasons I shall here set down will clearly enough evince.

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Certain it is, that the hoeing and paring the uplands, is a proof that it is thought difadvantageous to suffer any grass to grow among hops. Now the red bogs, which ought to be chosen for this purpose, are generally free from this inconvenience, if such it be; and it is evident that the

hop-planters are inclined to think it is one.

In dry seasons it is highly proper to water hopgrounds; but this, on account of the great expence attending it, is too often neglected, to the detriment of the crop.—But in bogs this may be done very conveniently, (as I have already said) and at a very moderate charge, the surrounding drain being a kind of constant reservoir, from whence

the planter may readily be supplied.

Low grounds are generally agreed by planters to have great advantages; they are sheltered by their situation from destructive storms, and not fubject to droughts. These conveniences bogs must be allowed to have in common with them, and others likewise which they possess peculiar to themselves. Neither the mildews of a dry, nor the heavy rains of a wet feafon, are fo injurious to what is planted upon them, as to what grows upon other low and flat grounds; while their constant moisture prevents the effects of too much hear, the fpunginess of the soil affords a passage to those waters which are apt to lodge upon other grounds. And besides all this, they are not infested with such fwarms of infects as are constantly feen in our upland hop-grounds.

The roots likewise in this manner of planting, have liberty to shoot as far as their nature inclines them to do, having three feet of rich soil to go through before they can reach the bog; and even if they should penetrate quite into it, they are likely to meet with better nourishment there, than either from a cold clay or a sharp sour gravel,

which

which form the bottoms of most of our hopgrounds. The poles besides will stand as firm in these bogs as they can in upland ground, the earth laid into the holes being pressed together, and confined by the toughness of the bog, which will occasion it to sustain them without sinking them any deeper than they ought to be sunking other hopyards.—And this removes all possibility of such an impediment.

C H A P. IV.

Misqellaneous Observations on Agriculture.—The new Husbandry and the old.—Some select Experiments made on different Kinds of Grain, with the Result of those Experiments.

AFTER having described the different kinds of soils, with the improvements which may generally be made on them, we shall naturally be expected to give proper directions for growing the various kinds of grain, roots, grass, &c. and of the time and manner of sowing them, with all those other matters which employ the husbandman in the labour of the field.

But before I proceed to this, it may not be amiss to offer some observations upon the nature of husbandry, which some have thought so easily reducible to an art, that they had nothing to do but to lay down a set of rules, and then to follow them implicitly almost upon every occasion.

Now from this practice I may be bold to affert, there never was one person that reaped any confiderable advantage. Experiments form the best guide in agriculture; yet even these do not always

bring

bring us the clear proofs required, on account of the different circumstances under which they are made, and the different manner in which they may be conducted.

Numbers of experiments have been made, to determine whether the new or the old husbandry were most profitable; these, in general, are recorded to have turned out in favour of the former; but it must be added, that the writers to whom we are to trust for the determination, have generally omitted to give the proper registers of their expences, &c. or giving them, have reasoned in such a manner upon them, as is by no means conclu-These gentlemen are generally very fond of telling us, that the refult of their experiments was highly in favour of whichever kind of husbandry they chose to adopt, without entering into particulars; others, when they have given us an account of one year's crop, proceed to tell us that confequently there is no doubt of its being as great, or even much greater, another year, and fo on.-While people reason in this manner, there is no coming at any thing of certainty by reading their works. It is eafy to recommend many apparent improvements in husbandry, which, however, when tried, would by no means answer, and consequently it is useless to mention them.

In a climate fo various as ours, it is particularly useful to repeat experiments, and not to draw hasty conclusions. Those who have money at command, and would wish to benefit themselves and their country, cannot certainly better employ it than in this way, if ever they mean to promote agriculture. It would be proper for them to set aside certain fields for experiment, and to keep a register of the result: this, when continued for several succeeding years, would furnish a better criterion for judging of the different methods of manuring, plow-

ing, fowing, &c, than all the learned treatifes that ever have appeared on the subject, in any age or

country whatfoever.

Upon the principle of experimental knowledge, I shall, in this place, forbear entering into a discussion of the question proposed, relative to the different kinds of husbandry; I shall only observe, that both have their advantages, and that the industrious and judicious farmer will hardly ever fail of succeeding in either, while he sows his seed in good time, and is not remiss in his attention to the operations of the plough, and the proceedings of those employed under him. The improvements which I have either made myself, or have authenticated accounts of from others, will best serve to clear up all the rest, and to establish what I have promised my readers, viz. A Treatise of Practical Husbandry.

In the conclusion of this article, I shall insert some occasional experiments which may be well adapted to the nature of a particular soil, and shew what advantage it is capable of producing, at the same time that they will likewise illustrate what I have observed above, how experiments may differ made at different times, even on the same kind of soil,

and with a fimilar culture.

With a view to discover the utmost persection of tillage and manure, a square perch was marked out in a field of a loose loam, an indisferent pasture ground, in the month of October, which was dug three seet deep. The first spit was the common field loam, formed by tillage, manure, crops, and the atmosphere; the second was of brick earth loam, of a more adhesive nature than the surface, and the third and sourth were of white clay, with some small chalk stones in it; these different strata were very well mixed in the digging with ten bushels of rotten farm-yard dung; the surface being

laid on the high sharp ridge, the dressing is the proportion of fifty-three loads per acre, thirty bushels each. In the succeeding February, two bushels of coal ashes were spread on it, and it was dug down to a level, and drilled with beans in rows dittant two feet afunder. They came up luxuriantly, and flourished with surprising vigour through the whole of a droughty season. They were handhoed five times, and running up to a vast height, the tops were cut off before any bloffoms appeared. It was expected that they would be laid like wheat or barley, but it proved otherwife; they podded favourably, and were reaped in the beginning of September.-Produce, twenty-three quarts; or, per acre, fourteen quarters, two bushels, and two pecks.

As the feason was unfavourable, this proves that bad seasons are worst to bad farmers, and that you may controul the effect of the worst by good husbandry—Fourteen quarters per acre is an unusual product. The cultivation of an acre in this manner will come to about twenty-four pounds, the value of the crop will be rather above twenty-one pounds. Considering the prospect of future crops, this may be even esteemed profitable; many other plants, as well as beans, would answer well to cultivate in this manner, but the fear of the first expence is what deters men from the undertaking.

In September, in the following year, a square perch was marked in the same field, it was dug four spits or three feet deep, ten bushels of rotten farm-yard dung being equally turned in, and the surface left as before. One bushel of coal-ashes, and an equal quantity of poultry dung, were spread upon the surface, and dug down the ridges, drilled it with tick beans in treble rows, one foot asunder, with three feet intervals. The beans grew sinely, and yet with a colour perfectly healthy.

They were hand-hoed four times, weeded twice. and the intervals dug in the imitation of horse-hoeing four times, the clods being each time well broken, and the surface left in a neat condition. The tops of these beans were cut off on the first appearance of a bloffom, and being reaped by the end of September, produced twenty-five quarts, one pint and a half per acre; or, fixteen quarters and three pecks and flev a origin galant

The expence, per acre, of cultivating land in the manner of this experiment, will be above twenty-nine pounds; the value of the product, twentyfeven pounds feven shillings, which is a very good return; the loss for the first year being considered as a preparation for future crops, it is certainly advantageous. The staple of this land being at once made, there is a vast space left for the roots to fpread in, and they will still find manure to the bottom of it.

A piece of fix perches square of barley stubble was marked out in the month of October, and plowed to the ridge.—In the month following it was plowed, and drilled with beans in equally diltant rows, two feet afunder; hand-hoed them thrice in the feafon, and reaped in August. The product was three pecks and fix quarts; or, per acre, three quarters and one bushel. This piece was afterwards appropriated to try the culture of beans year after year fuccessively, on the same land, to observe whether, and how far, they would degenerate.

In October, plowed up the stubble, and waterfurrowed it. - In the February following plowed it again, and drilled it in equally diffant rows, two feet afunder, as before; hand-hoed them four times, and hand-weeded them once, cut off the tops just as they were going to blossom. Product,

five pecks, two quarts; or, per acre, four quardocker have well and here

ters, three bushels.

Plowed up the stubble in November, watered and furrowed it as before; and in the February following plowed, and fowed it with beans broadcast.—The beans came up well, and carried a good appearance. Product, fix pecks; or, per acre.

five quarters.

Hence it appears, that the oftener you fow hoeing crops the better; nor does it fignify whether they are every year the same fort or not. These three improved each year, and it certainly was owing to the foil being kept fo remarkably clean, as it must be by a succession of hoed crops. Many lands have been run out of heart by the flovenliness. of tenants, which might be very advantageously treated in this manner for feveral years, whereby a husbandman may improve his farm, at the same time that he reaps a good profit by fuch a proce-

Two square perches of land were marked, which had been twice plowed, and in the month of February each of them was drilled with three-fifths of a pint of beans, in equally diftant rows, two feet afunder, one with the common horse-bean, the other with the tick-bean, in order to prove what difference there would be in the product. They were hand-hoed thrice and equally, reaped and thrashed in September. The produce of the horsebeans was five quarts, or, per acre, three quarters, one bushel; that of the tick-beans, fix quarts and one pint; or, per acre, four quarters, two pecks.—The superiority of the latter was, consequently, feven bushels and two pecks.

Thus it appears, that the tick-bean yields the best; and the price also being higher than that of the common fort, these two circumstances should

incline farmers to make use of them.

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The following year two square perches were marked, which had been twice plowed, and was drilled as above, in equally distant rows, two feet asunder, with horse and tick-beans: they were hand-hoed thrice.

The tick-beans produced feven quarts; or, per acre, five quarters, three buffiels.—The horfebeans five quarts and half a pint; or, per acre, three quarters, two buffiels, and one peck.—Superiority of the former, one quarter and three

pecks.-

These experiments have been made with the utmost exactness, and even in the same field, yet they have not always turned out alike; nor is that a matter to be expected, considering the various circumstances of weather and other accidents incident to husbandry; all that can be recommended to those who are resolved to become acquainted with these matters, is the frequent repetition of them, whereby they may be enabled to compare the products of different years, and judging by the average of the whole, proceed with the greater prospect of success.

CHAP. V.

Of Wheat.—Of the different Experiments used in steeping the Seed before it is sown.—Of foreign Corn.—Of the Manner and Effect of sowing it in England.—Of the Distempers of Wheat, and the Causes and Cure of them.

As the increasing the quantity of our wheat is a matter of great importance, I think it proper here to give the result of what experience has proved, relative to the many methods which have been fug.

fuggested, either for sertilising the seed, or preferving it from distempers, or by bringing grain from foreign countries, in order to increase its quantity or better its quality in this soil.

In order to give an idea of these matters, I shall present the reader with the following experiments.

In the month of September, in the year 1765, some pieces of fallow land being marked out, were sown with wheat prepared as follows.

Experiment I.

No. 1. Half a pound steeped for twenty-four hours in a brine of falt, strong enough to bear an egg, and then dried with lime.

2. The same time in the drainings of an horse-

dunghill, dried as above.

3. The same time in salt petre, as before.

4. The same time in bullocks blood, dried with lime.

5. Not fleeped at all.

The quantity of these grains was nearly similar, if any were better than the rest, it was No. 3. The produce nearly alike. They were sown broadcast.

In the fame month, fowed parcels of wheat, pre-

pared as follows.

No. 1. Steeped twelve hours in brine of falt, strong enough to bear an egg, dried with lime.

- 2. Steeped ditto in a mixture, half the above brine, and half the drainings of a horse-dunghill, dried with lime.
- 3. Ditto in a fort of lye made of lime, woodashes, and salt, dried with lime.

4. Ditto urine, dried with lime.

5. Ditto in ditto, and pigeons dung and lime, dried with lime.

These also were sown broad-cast upon the same day. The produce was, No. 1. three pounds.—
2. three

2. three and a half.—3. three and a half.—4. four. —5. four.—6. three and a half. The quality perfectly fimilar.

Experiment II.

In the same month, sowed some parcels of wheat, broad-cast, on the same breadth of fallowed land, thus prepared:

No. 1. Steeped twelve hours in urine.

2. Ditto in a lye of falt, pigeons dung, and wood ashes.

3. Ditto in a lye of falt-petre.

4. Ditto in a mixture, half No. 2. and half the drainings of a dunghill.

5. Ditto in bullocks blood.

6. Ditto in half ditto, and the other half urine.

7. Ditto in common falt brine.

8. Ditto unsteeped.

Of each of these half a pound was sown, and all dried with lime. The produce was, No. 1. three pound and a half.—2. three and a quarter.—3. three and a half.—4. three and a half.—5. three.—6. three and a half.—7. three and a half.—8. three and a half. The quality of each parcel proved the same, and the difference, in any of them, appears trifling.

Experiment III.

Sowed some spots with wheat seed on a fallow, in a different field, as under:

No. 1. Steeped twelve hours in a lye of lime.

2. Ditto in ditto of wood-ashes.

3. Ditto in ditto of pigeons dung.

4. Ditto in common falt brine.

5. Ditto in falt-petre brine.

6. Ditto in blood.
7. Ditto in urine.

8. Ditto in the drainings of a dunghill.

9. Steep-

o. Steeped twelve hours in a lye of falt-petre. wood-ashes, pigeons dung, and urine.

10. Ditto unsteeped.

Of each of these the quantity of seed was a quarter of a pound, and all were dried with lime. They were all fown on the same day in the month of September, and all afterwards managed in the fame The produce of each was as follows, No. 1. one pound, three quarters. - 2. one and a half.—3. one and three quarters.—4. one and three quarters.-5. two -6. one and three quarters.-7. two.-8, 9, and to. one and three quarters each:

The quality of the grain was, in general, the fame; if there were a preference to be given, it was to that which was not steeped at all. The urine and falt-petre, in point of quantity, appear to have some superiority, but it is not in any degree that is very remarkable, onto a out !! o:

Experiment IV.

In the month of October, in the same year, sowed feveral parcels of wheat on a fallow, in the same field as above, and in the following manner.

No. 1. Steeped for twelve hours in a lye of lime, falt-petre, wood-ashes, pigeons dung, blood, urine, and the drainings of a dunghill, all mixed together.

No. 2. In ditto for fix hours. No. 3. for eighteen hours.—No. 4. for twenty-four hours.

No. 5. Steeped for twelve hours in a strong mixture of foot and water.

No. 6. Ditto in ditto, foot and urine. 130 od

No. 7. Unfteeped.

belt of the preparation field Of each of these, as before, a quarter of a pound was fowed, and all were dried with lime. All produced two pounds, except No. 4. which was the longest steeped; the product of which was only one pound, three quarters. The grain was the fame;

fame; and all that can be inferred from the trial is, that too long steeping hurts the seed.

Experiment V.

In the month of October, marked out, in the same field used for the three first experiments, some pieces of fallow, and sowed them each with a quarter of a pound of wheat, thus prepared.

No. 1. Steeped for twelve hours in a strong lye

of wood ashes.

2. Ditto in ditto of common falt.

3. Ditto in ditto of falt-petre.

4. Ditto in ditto of foot.

5. Ditto in ditto of pigeons dung.

6. Ditto in ditto of lime.

7. Ditto in blood.

8. Ditto in urine.

9. Ditto in a lye of urine and foot.

10. Ditto in ditto of urine and blood.

of a dunghill.

12. Ditto in ditto, a mixture of all.

13. Ditto unfteeped.

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he e; These were all dried with lime, and managed alike. The produce was, No. 1, 2, 3. one pound, three quarters each.—4. two.—5. one and a half.

—6, 7. one, three quarters each.—8. two.—9. one, three quarters.—10. one and a half.—11. two.—12, 13. one, three quarters each.

The grain was similar; the superiority was still in favour of urine and similar mixtures; but though it might seem to prove, that these are the best of the preparations hitherto mentioned, however, this superiority being rather in quantity, and so small, very little particular recommendation can be given to them.

Upon the whole, therefore, it feems that all these maxims are rather matter of curiosity than

of

of real utility. It will appear to the unprejudiced reader, that they have had as fair trial as could possibly be given them, and every mode tried that could be proper upon such an occasion.

The next matter I shall speak of, is, the change of seed; as it is well worth while to enquire, whether this can really be of any benefit. I shall treat this as I have done the former subject, resting it entirely upon the result of experiment.

Experiment I.

In the month of October, three square perches of fallow, in a field in Sussex, the surface of which was loam with clay beneath, properly manured, was sowed in the following manner.

No. 1. With one pint of red wheat, of the same

county, raifed in the neighbourhood.

2. With ditto of wheat, from the Isle of Thanet.

3. With ditto of red wheat, from Isleham in

Cambridgeshire.

The produce of these spots was, No. 1. four quarts of good wheat; the value, forty-one shillings per quarter. Four quarters, four bushels, per acre.

No. 2. Five quarts; the value, forty-three shil-

lings. Three quarters, one bushel, per acre.

3. Four quarts and a pint; the value, fortytwo shillings. Two quarters, -six bushels, two

pecks; per acre.

The samples being shewn to a merchant, the prices were fixed as they stand. The Cambridge-shire exceeded the native wheat: the Kentish was superior to both of them in quality, as well as in quantity.

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the red wheat,

Experiment II. 10 all

In the same month, were marked out five square perches of fallow, in another field, and sowed thus.

No. 1. With a pint of red wheat of a neighbouring growth, for many years.

2. With ditto of white wheat of the same growth.

3. With bearded wheat ditto.

4. With ditto of red wheat, from the Isle of Thanet.

5. With red wheat from Cambridgeshire.

These being all managed in every respect alike,

the produce was as follows.

No. 1. Four quarts and a pint; the value, fortyone shillings. Two quarters, six bushels, two pecks, per acre.

2. Four quarts; value, forty-two shillings.

Two quarters, four bushels, per acre.

3. Five quarts; value, thirty-nine shillings. Three quarters, one bushel, per acre.

4. Five quarts; value, forty-three shillings.

Three quarters, one bushel, per acre.

5. Four quarts; value, forty-two shillings.

Two quarters, one bushel, per acre.

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It is observable here, that the bearded wheat yielded most in quantity, the Kentish excepted; but as generally is the case, it did not prove of so much value.

Experiment III.

Six square perches of fallow were marked out in the month of October, in another field, and these were sowed with the following different sorts of wheat.

No. 1. With a pint of wheat, the growth of one of our own fields.

2. With ditto, the growth of the next field.

3. With

3. With red wheat, once raised since it came from the Isle of Thanet.

4. With common bearded wheat.

5. With the hollow strawed bearded ditto.

6. With red wheat, from a fandy soil in Nor-folk.

In this experiment, No. 1. produced four quarts; the value, forty-two shillings. Two quarters, four bushels, to an acre.

2. Three quarts, one pint and half; value, forty shillings. Two quarters, fix bushels, two pecks,

per acre.

3. Four quarts, one pint; value, forty-three shillings. Two quarters, six bushels, two pecks, per acre.

4. Four quarts, one pint; value, forty-one shillings. Two quarters, six bushels, two pecks, per acre.

5. Four quarts and a pint; value, forty-one shillings. Two quarters, fix bushels, two pecks, per acre.

6. Four quarts; value, forty-one shillings. Two

quarters, four bushels, per acre.

Still the Kentish wheat exceeded in quality; the red from Norfolk equal in quantity, in quality inferior both to that and our own.—No. 1. was much bettered by a change of soil, though in the very same farm.

Experiment IV.

Ten square perches being marked from the first field, they were thus sowed.

No. 1. With a pint of wheat which grew in the

adjacent field.

2. With ditto that had grown in its own foil.
3. With ditto from a gravelly foil in Essex.

4. With ditto from the north of Lincolnshire.

5. With

5. With common bearded wheat which grew in the neighbourhood.

6. With ditto from Cambridgeshire.

7. With red ditto from a fandy foil in Norfolk.

8. With Kentish red wheat that had once been raised in our own lands.

9. With the same, but directly from the Isle of Thanet.

The produce was as follows.

No. 1. Four quarts; value, forty-one shillings.

2. Three quarts and a pint; value, thirty-nine shillings.—3. Four quarts; value, forty-one shillings.—4. Four quarts; value, forty-one shillings.—5. Four quarts and a pint; value, thirty-nine shillings.—6. Four quarts; value, forty-one shillings.—7. Four quarts; value, thirty-nine shillings.—8. Four quarts; value, forty-one shillings.—9. Four quarts and a pint; value, forty-two shillings.

Here still the bearded wheat and the Kentish produce most; but the latter being worth more than the former by three shillings a quarter, it

maintains a great fuperiority.

Experiment V.

In the month of October were fowed in the first field, where seven square perches were marked out, the following different forts of wheat.

No. 1. With a pint of white wheat from Hert-

fordshire.

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2. With ditto of red from Kent.

3. With a pint of ditto twice fown on this foil.

4. With the same quantity of red from the vale of Evesham.

5. With a pint of wheat from Russia.

6. With ditto of ditto from Isleham in Cambridgeshire.

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The produce of these was, No. 1. Three quarts; value, forty-three shillings.—2. Three quarts and a pint; value, forty-three shillings.—3. Three quarts; value, forty-one shillings.—4. Four ditto; value, forty-three shillings.—5. Four ditto; value, forty-two shillings.—6. Three quarts and a pint; value, forty-three shillings.—7. Three quarts;

value, forty-two shillings.

The best of all upon this trial, as on the former, is that from the vale of Evesham; the Russian comes next.—Some feed from Dantzick was afterwards tried, which come still nearer. The foreign wheats indeed, in general, exceeded the English, which (as fomething of the same nature happened. to most of our own grain when removed from one place to another) may fairly be attributed to a change of foil; and we may likewise be led from these experiments, to draw some useful conclusions. Among the rest, the following is a summary of the refult of these experiments.—That foreign wheats, from the most opposite climates, are superior when planted here to most of our own .- That fowing wheat, which for many years has been raised in the neighbourhood, is quite unprofitable.—That there is not much difference between the red and the white wheat; that the bearded yields much in quantity, but is deficient in quality.—That the Cambridgeshire wheat is generally good when removed to a foil made up of a stiff loam; that the Kentish red wheat is better; but that the seed obtained from the vale of Evesham, both in quantity and quality, generally furpaffes them all.

Whilst I am treating on this subject of experiments relative to the seed of wheat, I shall introduce the trials made relative to the distempers of that grain in order to find out whether they really existed at all in the seed, or were merely acciden-

tal, or whether fometimes the former, and fometimes the latter, was the case, which seemed to be

the most probable conjecture.

For this purpose, in October, a piece of fallow land was pitched upon in one of the fields, (called the first in the course of the former experiments.—
It was harrowed, and some drills being marked, was sowed in the following manner.

Experiment I.

No. 1. With an hundred grains of clean, fine, weighty, red wheat.

2. With ditto of thin, shrivelled, red wheat, but

clean.

3. With ditto, rubbed in the dust of burnt wheat.

These being all kept clean by proper weeding and hoeing, were found to be all found, and no difference could be discovered between them.

Experiment II.

In the middle of the same month, marked some drills upon a piece of well fallowed land in the same field, and sowed them.

No. 1. With an hundred grains of clean, weigh-

ty, well-looking, red wheat.

2. With ditto of ditto, rubbed with the powder of burnt wheat.

3. With ditto of ditto, shrivelled, thin, ill-looking wheat, but clean.

4. With ditto of ditto, rubbed with the black

dust.

5. With an hundred grains, picked at random, rubbed in the black dust, and afterwards well washed in water.

The weeding and hoeing being the same to each, the produce was:

F 3

No. 1.

No. 1. Clean and good wheat.—2. Rather inferior, but clean.—3. Good wheat, but with one burnt ear.—4, and 5. Without any burnt.—So that the black powder here feemed to have no share in propagating the distemper.

Experiment III.

Some other drills were marked in the same month, in the same land, in order to try the effect of the soils.

No. 1. Well fallowed land.

2. An old baulk that had at different times been weeded, and now but once ploughed.

3. Clover land, once plowed.

4. Fallow land, dunged with rotten farm-yard dung.

5. Ditto, dunged with long farm-yard dung.

These were all sown with clean, sound, weighty wheat.—No. 1. An hundred grains in each drill, produced clean, good grain.—2. Thin and shrivelled, with several ears burnt.—3, 4, and 5. were as good as No. 1.—Thus the baulk produced the only bad amongst them.

Experiment IV.

The first week in November, in the same year, fome drills were marked out in the same field.

No. 1. Summer fallowed.

2. Ditto, and dunged with rotten yard-dung.

3. Ditto, and dunged with long horse-dung.

4. A two years fallow, and twice well manured with rotten compost of farm-yard dung and turf.

5. After barley, on one plowing.

6. After two crops of oats, on one plowing.

A double drill on each, one fown with clean, found wheat, and the other with thin, poor, shrivelled grain. The weeding was equal; the product as follows:

No. 1.

No. 1. Good feed.—Fine, clean wheat, in general, but with two burnt ears.

Ditto, bad feed .- Ditto, only with four burnt

ears.

No. 2. Good feed.—On an equality with No. 1. Ditto, bad feed.—The fame with the good.

No. 3. Good feed.—Good corn, but inférior to

No. 2.

Ditto, bad feed.—Several burnt ears, and every way inferior to that fprung from the good.

No. 4. Good feed.—Exceedingly fine, bright, and weighty, better than all the reft.

Ditto, båd feed .- Equal to No. 2.

No. 5. Good feed.—Indifferent grain, with three burnt ears.

Ditto, bad feed.—The fame.

No. 6. Good feed.—Thin, and rather shrivelled, but clean.

Ditto, bad feed.—Very bad grain, with feven burnt ears.

This experiment turned out less to the disadvantage of the bad seed than could have been readily imagined.

Experiment V.

Twelve drills were marked in the fecond field, as follows:

No. 1. Summer-fallowed, and fown with clean, good feed.

2. Ditto, with thin, shrivelled seed, but clean.

3. Ditto, and manured with rotten yard-dung.

4. Ditto, with bad.

5. Ditto, and manured with long yard-dung, fowed with good feed.

6. Ditto, ditto, fowed with bad feed.

7. A two years fallow, and twice manured, once with rotten farm-yard dung, and once with coalashes;—good seed.

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8. A two years fallow, and twice manured, once with rotten farm-yard dung, and once with coal-ashes;—bad seed.

9. On a wheat stubble once plowed; fowed

with good feed.

10. Ditto, with bad.

11. After two crops of wheat and oats on one plowing; fowed with good feed.

12. Ditto, with bad.

The weeding, &c. was much the same with all.—No. 5, 6,—10 and 12, appeared in the middle of July following to be much mildewed, but the rest escaped. The product was, No. 1. A sound and bright corn.—2. Somewhat inferior.—3. Equal to No. 1.—4. Similar to No. 2.—5. Indifferent, with three burnt ears.—6. Much worse, but with no burnt ears.—7. Very fine corn.—8. Ditto, and equal to No. 1.—9. Middling, as being inferior to No. 2.—10. Worse.—11. Very bad, with three burnt ears and two smutty ones.—12. Worse still, with two burnt ears.

In the good management, the bad feed has but very little disadvantage in this experiment, but

loses much by bad husbandry.

Experiment VI,

The fecond week in October, in the fucceeding year, twelve drills were marked out in the first field upon a well-fallowed piece of land, and sowed as follows:

No. 1. With an hundred grains of clean, found,

weighty, red wheat.

2. With ditto of thin and shrivelled.

3. With ditto, rubbed in the dust of burnt wheat.

4. With ditto, rubbed in the dust of smutty

wheat.

5. With

5. With an hundred grains of thin and shrivelled wheat, naturally affected with the burnt grain.

6. With ditto, naturally affected by fmutty grain.

7. With ditto, burnt grain well washed in clean water.

8. With ditto, fmutty grain ditto.

9. With ditto, apparently found grain, but from roots bearing collateral burnt ears.

10. With ditto, apparently found, from fuch as

bore collateral fmutty ears.

11. With ditto, found, red wheat, but rubbed in the dust of burnt barley.

12. With ditto, found wheat, rubbed in the dust of burnt oats.

The culture, while growing, being the same to

all, the following was the produce:

No. 1. Very fine corn, and quite found.—2, 3, and 4. Much the fame.—5. Fine corn, but with three burnt ears.—6. Ditto, but with three fmutty ears.—7, and 8. Fine, found corn.—9. Ditto, but with five burnt ears.—10. Ditto, with four burnt ears.—11. Ditto, with two burnt ears.—12. Ditto, with five burnt ears.

The result of this experiment, as well as of some more that were made in the same fields, is, that the quality of the grain is not a matter of so much consequence as some have imagined; though on the other hand, burnt or smutty grain is more liable to those distempers than sound seed. It is likewise evident, that wheat is affected by the dust of burnt barley, or oats, as well as by that of burnt wheat.

Experiment VII.

On the same day that the last trial was executed, fourteen drills of fallow land being marked out in the second field, were thus sown:

No. 1. With an hundred grains of clean, weighty,

red wheat.

2. With

No. 2. With an hundred grains of thin and shrivelled wheat.

3. With ditto, rubbed in the dust of burnt wheat.

4. With ditto, rubbed in the dust of smutty wheat.

5. With ditto, naturally affected with the burnt grain.

6. With ditto, by the smutty grain.

7. With ditto, by the burnt grain, well washed in clean waters.

8. With ditto ditto, smutty grain, washed.

9. With ditto, apparently found grain, but from roots bearing collateral burnt ears.

10. With ditto, apparently found grain, but

from roots bearing collateral fmutty ears.

in the dust of burnt white wheat, but rubbed

12. With ditto, found red wheat, rubbed in

the dust of burnt great wheat.

13. With ditto, found red wheat, rubbed in the dust of burnt oats.

14. With ditto, found red wheat, rubbed in the

dust of burnt oats.

The hoeing, weeding, and other management, were the same to each.—No. 2.—and 12. were, in some measure, mildewed while standing. The produce was,—No. 1. Sound, weighty grains.—
2. Indifferent, five shillings per quarter worse than the first.—3, 4, 5, 6, 7, and 8. sound and weighty.—9. Good corn, but with five burnt ears.—10. Sound and weighty grain.—11. Sound grain also, but with three smutty ears.—12. Sound and weighty.—13. Not equal to the rest, and with two burnt ears.—14. Sound, good, and weighty grain.

This, like many other of the experiments made, was by no means fatisfactory, in proving that the dust was the occasion of the distemper.—Bad seed

fhould,

should, however, by no means be used, though good husbandry, with a good soil, will do much in favour of the worst, as has been experienced.

Having spoken of the experiments tried in England, and within our own knowledge, we will now proceed to give the opinions of some foreigners and others, with regard to these two important articles of bettering the seed of corn, and of preventing it

from being distempered.

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M. du Hamel observes, That the Abbe de Vallemont had composed a prolific liquor, by means of which the husbandman was to rest affured that he should reap vast crops without manuring, or scarcely plowing his land. He was only to put his feed into this admirable liquid, which was to open, strengthen, and amazingly fertilise the germe. Now the germe, or bud, is generally allowed to be an embryo which contains the whole plant in miniature: if this be the case, how improbable must fuch a thing be: yet the doctrine was greedily swallowed by those who hoped for much gain with little expence or trouble. "What benefit (fays this ingenious author) can this germe receive from any prolific liquor; the rest of the seed serving only to feed the young plants. As foon as the roots of the latter are spread, the husk of the former only The most then that can be expected from fuch liquors, is only to render the nutritive substance of the seed more fit to support the young plant; and this can only be till it has struck out its roots, after which the lobes of the feed ferve to support it no longer."-

However, the Abbe de Vallemont's mixture was extolled as a wonderful discovery, and supposed to be endued with a magnetic virtue of attracting from the air certain principles, which are not even certainly known to exist in it. Numbers of pro-

lific

lific liquors were afterwards projected, and fome ill-made experiments (as this gentleman observes)

confirmed men in the error.

" I myself (fays he) was deceived by such partial trials; but when I extended them to three or four acres of ground, this amazing fertility no longer took place, and I began to doubt the efficacy of these boasted specifics. About the same time, I faw a fingle grain of barley produce two hundred and thirty stalks without the use of any preparation; and was informed by the reverend Dr. Hales, that another grain of unprepared barley had actually produced an hundred and fifty-four ears. From hence I concluded, that the prodigies of vegetation fo much vaunted by fome writers, as the effects of their infusions, have, in fact, been owing to the nature of the foil, good culture, and to the grains being placed at fuch distances from each other, that their roots have had room to fpread, and thereby to collect a great quantity of nurture. I then had recourse to new experiments, which confirmed me in this opinion.

"We are informed (continues he) in the Political State of England, that a grain of wheat which grew by chance in a bed of onions, and had not received any preparation, produced five thousand, fix hundred grains; upon which the author remarks,-That we must not from thence infer, that the country where fuch a thing happens, is naturally more fertile than another, or that the method of agriculture practifed in it is better than elfewhere; but that the cause of these prodigious growths is, that the grains stand fingle, and in a good foil; that the only consequence which can be drawn from thence is, that the new husbandry comes nearest to that state, in which these surprising growths are produced; that it certainly must increase the product of the crops, and that it will

probably require less feed than in the common way*.

Though it was pretty well proved by our experiments, that good culture and proper manures contribute more effectually to the increase of crops, than all the boafted prolific liquor in the world; ver feveral, out of zeal for the public good, have published, some, the advantages which they think arise from the use of certain fertilising steeps; and

others, receipts for making them.

" In this spirit, M. de la Jutais has given us a little tract, intitled, The True Philosopher's Stone; according to which, an admirable prolific liquor is to be thus made. - Fuse some nitre in an iron vessel, and when it is hot enough to burn the substances which are to be added, throw in a small quantity of the same seed as you intend to sow: for example, if you would have a prolific liquor for wheat, throw a little wheat upon the nitre; if turnips, put in turnip-seed, and so These seeds take fire, are consumed, and incorporate with the melted nitre. Your prolific liquor is then made, and you have only to mix the nitre with water. What refults from this operation? Certainly, nothing more than that there is in this prolific liquor, a great deal of nitre, with a small portion of fixed nitre, or alkaline falt. Whether this nitre be fired with wheat, barley, turnip-feed, or with pulverised coals, all chymists will allow the result to be the fame, and that the fame liquor might be made by mixing a little alkaline falt with a strong folution of falt-petre. The question is, What effect it will have upon vegetables. To try this fairly; two ex-

actly

^{*} This is true only in part: Wheat feldom pays the expences attending it, and therefore generally answers in the broad-cast. M. du Hamel's own observation is here against him; viz. That by a few grains we cannot judge of the product of acres. But this matter I shall treat of more fully in a future chapter, when I come to draw a comparison between the new and the old husbandry, as supported by experiments.

actly fimilar fields should be sown, the one with wheat prepared by the prolific elixir, and the other with wheat only limed in the usual way, taking care to sow an equal quantity in each field; for the single circumstance of diminishing the quantity of the seed, may increase the crops in years, when, as the farmers express it, the corn does not tiller.— Many have been deceived by not attending to this circumstance; but the following are well-made experiments.

"M. Delu, after trying M. de la Jutais's effence three times, with the most scrupulous care and ex-

actness, thinks it of no fort of service.

"M. Peirol communicated several experiments, which he had made with great care, in order to satisfy himself whether these prolific liquors have any virtue, and those trials made him then hope for success. I thanked him for his obliging letters, and exhorted him to repeat the same experiments, with some new precautions which I thought important. He did so, with all possible care; and it is with real pleasure that I shall give a just account of them, because they seem to me extremely sit to dissuade those persons who wish well to agriculture, from putting their trust in such delusions. Instead of running after an empty shadow, they may employ their time in such an useful manner, as that the public may be benefited by it.

"M. Peirol fowed both in his own garden, and in that of the Intendant of Auvergne.—1. Manyeared wheat.—2. Rath-ripe barley.—3. The common red wheat of the country; and had from each

of them an amazing increase.—

"Each plant of the many-eared wheat had from fifty to ninety-two stalks, and these last yielded thirteen thousand, eight hundred grains. Some of the rath-ripe barley had two hundred and forty-four stalks to each plant, and yielded fourteen thousand, six hundred and forty grains.

" Several plants of the red wheat had three hun-

dred stalks, but the grain was eaten by birds .-

" These were fine productions; -but the most important thing to be observed here is, that M. Peirol fowed all these different kinds of grain as well in his own garden as in that of the Intendant, on the same day, which was the eighth of September, 1758. Part of this corn having been steeped in the Abbe de Vallemont's fertilifing liquor, while the rest had not been infused at all, yet their productions were quite alike; the ground had been prepared exactly in the same manner for the steeped and the unfteeped grain; and both were equally watered, from time to time, with that prolific wash. Now this last circumstance spoils the whole experiment; for who can doubt, but that watering the plant with impregnations of dung, which he has prescribed, must give them great vigour; even more than a confiderable quantity of dung itself would have done?-However, the following experiment is luckily without that fault.

"On the fourth day of April, 1757, M. Peirol divided a pretty large field into five equal parts.— The ground was in good tilth, and he fowed it with

barley.

" The first part was sowed with unsteeped bar-

ley in rows, a foot afunder.

"The second was sowed with the same kind of barley, steeped in the Abbe de Vallemont's liquor, and likewise in rows a foot asunder.—Both had a plowing between the rows towards the end of April.

"The third was fown in broad-cast, according to the custom of the country, except that a quarter part of the usual quantity of seed was retrenched;

but still it was the same fort of barley, and this had

been steeped in M. de Vallemont's liquor.

"The fourth division was also sown in broadcast like the former; but with this difference, that the seed was steeped in a prolific liquor, invented by M. Robineau.

"Lastly, the fifth part was fown entirely in the common way, with the usual quantity of the same

kind of feed, unfteeped.

" The following was the state of these five divi-

fions at harvest time.

"The first and second, which had been sown in rows, with only a quarter part of the quantity of seed generally used in the common way, but prepared for the one by being infused in the Abbe de Vallemont's liquor, and sowed in the other without any impregnation, were both very fine, and yielded a great deal of grain.

"The third and fourth, which had been fown in broad-cast, with an abatement of only a quarter of the usual quantity of seed, and where the grain for one had been steeped in De Vallemont's liquor, and that for the other in M. Robineau's, were both middling; and, indeed, not visibly different in any

respect whatsoever.

The fifth fpot, which had been fown intirely in the common way, and with the usual quantity of seed, was the worst of all.

"Though M. Peirol was prejudiced in favour of prolific effences, yet he concludes from this

experiment:

"I. That the unsteeped grain used for the first mentioned portion of the field, having yielded as fine a crop as that of the second, which was steeped, infusing the seed does not contribute much to make the plants tiller.

"2. That the products of the third and fourth divisions being quite alike, M. Robineau's steep is

not better than M. de Vallemont's.

fifth, and those of the third and fourth pieces of ground, was probably owing to the different quan-

tity of feed.

"4. That the superior beauty of the first and second, which surpassed all the rest, was occasioned by the grains being so far distant from each other, that the roots of the plants had sufficient room to collect their nourishment; and that the husbandman was enabled to stir the ground between the rows, in the spring, by which the vigour of the plants was considerably increased. This tended to consirm the advantages of the new husbandry; and M. Peirol was so far convinced of it, that he sowed a very large track of land, near Riom, in the same manner as the two first parts of the above-men-

tioned experiment.

" He has likewise made another trial of De Vallemont's specific, by planting vines in two different places.—In one of thefe, where the foil was good, the common practice was followed, and the cuttings sprouted soon:-in the other, where the ground was not fo good, each cutting was watered with two quarts of the liquor recommended by De Vallemont. These last shot out later, but then grew with great strength, and retained their leaves a long time. It cannot be doubted, but that an infusion of dung will invigorate plants, and make them grow faster than they otherwise would. The owners of the respective lands are here to consider, whether the expence of people to do this business, may not be greater than the advantages accruing from it will repay; but it is certain, that by thus watering the newly-planted cuttings, especially with a strong infusion of dung, they will secure their taking root.

"To fatisfy myself (continues he) with regard to Mr. Robineau's pretended prolific liquor, I

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chose a piece of ground laid out for wheat, and divided it into three equal parts. One of these was fown in the common way, with feeds only limed, and produced an hundred and ninety-two sheaves to an acre, which yielded fixty bushels of corn. Another was likewise sown in the common way, with feeds only limed, but two-fifths less in quantity than is generally used, and produced an hundred and fixty-eight sheaves, which yielded fifty-four bushels. The third part was fowed with the same quantity of seed as the first, but prepared according to M. Robineau's direction. This produced but an hundred and fifty-fix sheaves, which yielded fifty-four bushels of grain.—From whence it follows, that his method was not of any fervice to the crop.

"His liquor, when distilled over a very slow fire, yields a little brandy; what remains in the matrass yields a great quantity of salt-petre; and the residue is a bitter water, which contains a small portion of alkaline salt. This is nearly what would

be obtained from M. de la Jutais's liquor.

"M. Vandusfel has also tried M. Robineau's prolific liquor, and found it attended with no other effect than that the field, when it was used, had somewhat fewer smutty ears than other grounds, for which the seed had not been so prepared.—But other seed, which he steeped in an infusion of dung, ashes, and lime, produced corn totally exempt from smut."

With regard to finut and burnt grain, of which we have spoken so much, this author is very explicit in his opinions.

First, he says, That the smut entirely destroys

the germe, or substance of the grain.

Secondly, That it affects not only the ear, but also, in some degree, the whole plant, when it has made a great progress.

Thirdly,

Thirdly, That it very feldom happens but that when one stalk is fmutty, all the ears of the other stalks, springing from the same root, are so too.

Fourthly, That so early as in March, or April, upon opening the hood, or blades, which cover the ear, and examining the young ear, when not above the fixth part of an inch in length, and almost close to the roots; the embryo has been found already black, and attacked with this distemper; though, perhaps, it may not always seize the plants so

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Fifthly, That when the distempered ear comes out of its covering formed by the blades, it looks lank and meagre; the common and immediate coverings of the grains are, in this case, so very slight and thin, that the black powder is seen through them; and from this time nothing is found in the room of grains but a black powder, which has a sætid smell, and no consistency.—As this powder, of which the constituent particles have but little cohesion, and of which the coverings are destroyed, is easily blown off by wind, or washed away by rain, the husbandman in housing these plants, houses only skeletons of ears. If any impression of this powder remains, it is easily taken off by sifting.

M. Tillet, who gained the prize proposed by the academy at Bourdeaux, for the best account of what renders black the mealy substance of grain, has also observed, that these corrupted ears are often found to be vitiated even in the hood, though this last appears as green and perfect as if nothing were the matter with the corn. The upper part of the stalk of a smutty plant is not commonly quite strait, from within about an inch below the ear.

—If such a stalk is squeezed there, it scarcely yields at all to the pressure: if it be cut assume about a quarter of an inch below the ear, it will be found

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almost

almost entirely filled with pith, so that only a very small opening can be perceived in the stalk, instead of that large pipe which is discernable in healthy stems. M. Tiller concludes from hence, that the circulation of the juices is obstructed in the upper

part of the stalks of smutty plants.

As to the causes of the smuttiness of corn, it has been said it is not owing to a want of secundation in the plants, any more than it is to the settling of wet upon the ears, to sogs, nor to the violence of the sun-beams; since the ears have been seen smutty long before they ceased to be covered with the blades, which continue green till the distemper has made a great progress. And the same observation may serve to resute the opinion of those, who suppose the cause of the smut to be in the grains after they are formed, and before they are past their milky state.

There are those also who have ascribed the smut of corn to the moisture of the earth; but seldom do we see more of this distempered grain in the lowest, than in the highest part of a field. Above all, why should there be, as generally there is, a single smutty plant; why a single smutty ear in the midst of a number of sound ones? Too much moisture may, however, favour the progress of the smut, though it may not, perhaps, be the immediate cause of it; which latter opinion seems probable, because we find the corn generally more distempered in wet seasons than it is in dry ones.

That infects may be the cause of this, as well as of many disorders in different plants, is what cannot be denied; but nothing amounting to a proof of this has ever yet appeared. Insects have, indeed, been perceived in smutty corn, but this surnishes no argument, as these animals were by no means peculiarly different from such as have been found in the most sound and healthy.—The corn-

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taterpillar, as it is called, devours the substance of the grain, but it does not occasion smut. Flies lay their eggs upon these seeds, and the worms and maggots proceeding from thence eat the seeds; neither do these produce any thing like smut. Dr. Hales, in order to try whether this distemper did not originate from bruised seeds, ordered some to be bruised with a hammer;—they grew well, and bore ears which were not at all smutty.

Some have conceived that pigeons dung, and sheeps dung, laid on the ground, produce this diftemper: but we have seen large pigeon-houses, the dung of which is strewed upon wheat lands.—The sheep are folded upon others; yet the corn which grows on such grounds, is by no means particu-

larly infected with fmut.

It has been observed by M. Aimen, M. D. that fmuttiness in corn cannot be derived from a defect in the fap, as all parts of the plant, except the ear, look healthy; and there are plants, the roots of which are perennial, and which appear in full vigour, though their ears are fmutty every year. It is his opinion, that any thing which weakens the plant, is most likely to bring on the smut: as an instance, he fays, that in his country they cut rye as foon as it spindles, for the fodder of their cattle; and that this rye generally produces other ears, which mostly contain nothing but distempered grain. He adds, that feed corn which has been pricked, or run through with a needle, that which is not thoroughly ripe, and likewise that which produces lateral, or fecond ears, is generally lmutty.

This gentleman supposes, that the smut in corn is produced by a kind of ulcer. In order to ascertain how such a matter could happen, he examined several grains of barley with a microscope;—some of them were bigger than others, some very hard,

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and some yielded to the pressure of his nail: some were of a deeper, and others of a lighter colour; fome longer, and others rounder than he conceived they ought to have been; their rind was fometimes wrinkled in feveral places, whereas it ought to have been fmooth; and lastly, he perceived that upon some of them there were blastfpots, which, upon examination, appeared to be covered with a fort of mould. These grains were carefully separated, according to their different qualities, and were fown apart, but in the fame ground. All the mouldy grain, he fays, produced fmutty ears, while the shrivelled, the parched, and those that were attacked by infects, either grew not at all, or growing, had no appearance of this diftemper.

After this, M. Aimen singled out a parcel of found grains, sowed them, and, in a little time, took them up, in order to examine them again with a magnifying glass. Some of them appeared mouldy, and these being replanted, produced smutty ears.—This, that gentleman does not pretend to be the only cause, but from his own experimental knowledge, he pronounces that it is one of the

causes of this distemper.

Yet, notwithstanding all this, it is a problem not easily to be solved, how mouldiness can produce this disorder, since as soon as the seed has sprouted, and produced its plant, the whole substance of the grain is consumed; for which reason, whether the hulls, or coverings, grow mouldy or not, seems to be in this case a matter of as little consideration as in that of the prolific liquors. It is, indeed, easy to suppose, that if this mouldiness attacked the plant, it might either kill, or render it poor and weak; but it is not so easy to determine how this mouldiness should affect only the organs of fructification,

and destroy them without doing any visible injury to the other parts of the same plant, even though it be a perennial one. These, however, are facts which are related; if we should conjecture from thence, that, supposing the plant to be only the increase of the embryo, the organs of fructification which exist in miniature imperceptibly in the seed, were already affected by the mouldiness, before they were deposited in the earth; by this method of reasoning, we might, perhaps, have some chance of accounting for this affertion of M. Aimen's; but experiments properly conducted, and faithfully related, are always more valuable than any conjectures.

One of the methods the above ingenious person prescribes, for the prevention of smut in corn, is, that of chusing the best of corn for seed, which should be limed immediately after; observing that every possible method to make the produce of such corn

mouldy, has ever proved ineffectual.

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M. du Hamel says, (as I have already observed) that from all he can gather, either by theory or practice, the black powder of smutty corn does not appear to be contagious. One maxim which M. Tillet recommends, is certainly a proper one, and that is, good tillage; for whether the distemper exist in the plant, in the soil, or in both, this is a method which is very likely to remove it.

M. de Lignerolle says, that the surest method of avoiding smut, and which he has practised with success for a number of years, is, that of changing the seed every year, and being careful that the seed-corn should be thoroughly dried and ripe, and that it be not smutty, nor have any smutty powder sticking to it *. He advised also to pour

boiling

^{*} This last precept is certainly of little or no use, if experiments may be trusted to, as are also some of the following prescriptions.

boiling water upon quick-lime in a long tub, and after the ebullition is over, as much cold water as there was hot, and to stir it all strongly together, to dissolve the lime; and thoroughly mix it. The quantity of wheat to be sown is to be sprinkled with this lye, and then well stirred with a shovel, and laid in a high heap. The grain should be kept for a week after this preparation; turn it every day, lest it should heat in such a manner as to destroy the germe. And the projector says, that by these means he has contrived to have no smut upon his corn, when that distemper has infected all the fields around him.

Another of these projectors, thinking the steeps generally used to be too expensive, mentions that he has found out a peculiar one of his own, of

which he gives the following account:

"I have had (fays he) the good fortune to accomplish what I wished; for now I only use pigeons-dung, ashes, and quick-lime; with sea-salt, where this last can conveniently be had. I have sometimes made with these ingredients steeped in water so strong a liquor, that it has even destroyed the germe of the grain. But there will be no danger of that, if care is taken to observe the subsequent directions, which are the result of seven years successful experience, even at times when farmers, who have neglected to follow them, have had such wretched crops as would not pay the charge of reaping."

Then follows the recipe, with which, in his own

words, I shall present the reader.

Take quick-lime and pigeons dung of each twenty-five pounds; forty pounds of wood-ashes, and twenty-five pounds of sea-falt, or salt-petre. Put all these into a tub large enough to hold half-a-hogshead of fair water, which is to be added to them. Stir them all well with a stick, till the lime

lime is quite diffolved. This lye will keep for fome time without spoiling: it must be stirred again just before the grain is steeped into it. The corn is then to be put into a basket, and plunged into the lye, where it must remain till it has thoroughly imbibed it; after which it is taken out and laid on a heap, till it is quite drained of all its moisture. Or, take a mashing tub, fill it with grain to within four inches of the brim, and then pour in the lye well ftirred before-hand: when the tub is full, let the lye run out at the bottom into fome other veffel, in order to use it again for more corn: let the grain then be taken out and laid in a heap to drain, and continue in this manner to steep all your feed-corn. The wheat thus prepared, may be fown the next day, and must not be kept above five days, left it should heat. This is faid from experience. The quantity of lye prescribed. will ferve to prepare twenty bushels of wheat."

To this we must add, that count Ginanni, a patrician of Ravenna, who has written upon distempers of corn in the blade, has deemed the rust incurable where it has once taken place; but as a preventative, he says, that he has sprinkled the plants before their ears were formed in their hoods, with sal ammoniac, or salt-petre, in water mixed with salt of tartar, and other alkaline substances; but at the same time it is to be noted, that he has mentioned these methods as being too expensive for the use of sarmers. He justly thinks, that sowing thin, and keeping the corn quite free from weeds, and well tilling the land, will be a good preservative, as he himself has experienced.—

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As to the burnt grain, that is not by any means to be confounded with the smutty; it is another, and also a more dangerous distemper. Smut, indeed, occasions a total loss of the ears infected with it; but the powder being extremely fine, and easily

easily scattered by the winds, even if it should be allowed to be infectious, cannot easily communicate that infection. But the burnt, or vicious grains, being often housed with the sound ones, infect them with a contagious distemper; at the same time that they render the flour brown, and communicate a disagreeable scent to it.

As to the characteristics by which we are to distinguish burnt grain, they are, generally speaking, to be collected from the following description:

1. The plants which are to produce burnt grain

are strong and vigorous.

2. The ears attacked with this distemper are not, at first, readily distinguished from those which are sound; but after their blossoming is past, they become of a deep blueish green, and then turn whitish, at which time they are easily known. An intense heat of the sun, with a fog preceding it, has generally been thought (says a foreign author) to be the cause of this distemper. I am apt rather to attribute this to the nature of the soil itself, a maxim which the experiments mentioned in the first part of this chapter seem to confirm.

But to proceed.—It is faid, that though all the ears which proceed from the fame feed, are usually attacked with the same distempers; yet M. Aimen and M. Tillet have found sound ears on the same plant with the infected. [So has the writer of this system, but from thence has been able to gather nothing material, in order to help him in tracing the cause of such distemper. But these gentlemen go farther, and affert, that they have even seen single grains which contain partly white flour, and partly this destructive burnt powder.]

They proceed to tell us, that the husks, or outward coverings of the grains in burnt ears, are almost generally found; with this difference only,

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that when their ears begin to open, they look more dry and more parched than the found ones.

The skin, or immediate coverings of the grain in burnt ears, is not here destroyed, as it is by smut. This covering still retains consistency enough to preserve the grain in nearly its natural

state, and to make it look whitish.

Burnt grains, we are told by these authors, are generally rounder, shorter, and, above all, lighter than the sound grains. Sometimes they prove larger, sometimes smaller, but seldom of the exact size with the sound ones. The surrow, likewise, which runs lengthways with the grains of wheat, is sometimes entirely effaced, the pistils at the end of the grain are likewise often found dried and withered; nor is the germe perceived at the bot-

tom of those grains which are burnt.

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Yet till the time of bloffoming, but little difference is to be observed in these so different sorts of grain. It is at the critical time in which Nature fends forth the bloffoms, that these critical distinctions appear; then the husks of the distempered corn not only turn blueish, but are more or less speckled with small white spots; their grains, bigger than in their natural state, are likewise of a deeper green; and fo long as they preserve this colour, they stick very close to the bottom of their chaffs. This distemper frequently attacks the ears of corn (as has been faid) while they are yet very young. In this case, the grain fades and languishes, the embryo becomes here and there of that deepgreen colour before-mentioned; the infected ears have not the same confistency as those which are found, and their husks become dry and whitish as the diftemper increases.

But still the grains retain a small degree of firmness; and, if opened, they are found to be full of a substance which feels unctuous, is of a blackish,

brown

brown colour, and of a nauseous smell. It is not a light powder like that of smutty ears—the powder of burnt grains has some cohesion; and when we view them through a microscope, they

appear in general larger than those of smut.

The grains before the time of flowering appear full, of a white substance, which begins to turn brown first next the stem; the colour afterwards spreads by degrees over the whole ear; the grains then look as if they were separated into equal parts by furrows, which disappear in proportion to the increase of their magnitude.

Those grains which are much infected with the distemper distinguished by the name of burnt grain, generally appear incapable of growing. Yet grains picked out of ears of which the greatest part was burnt, being sown in part of a kitchen garden, have produced very strong plants, and some sound ears appeared amongst a number of smutty ones.

According to those who have made some of the above experimints, when the burnt grains are crushed by the flail in thrashing, their black powder being scattered, sticks to the hairs at the end of those which are found, opposite to the germe, where it forms a black fpot, for which reason those latter become what is called spotted, speckled, or at the point. " Many grains, fay they, which escape the flail remain entire, on account of their lightness. Some of these are separated by throwing the corn round with a shovel, and many more by good winnowing; but yet the spot at the end remains, as will also several of the burnt grains; and these will be sufficient to discolour the whole float of the heap, rendering it brown and disagreeable to the taste. To prevent this inconvenience, and that the bread made of this corn may be the better, those grains are to be cleaned in tin sieves made like a drum. They are afterwards washed, and all the

the grains which swim on the surface of the water, and which generally are burnt grains, are taken off with a skimmer. The water washes off the black spot which is only superficial, as appears from its being removed from the grain, is rubbed with a cloath.

As particular kinds of dung are looked upon to be the immediate causes of this distemper, whilst others affert it to be hereditary; amongst others, M. Tillet made the experiment upon grain, of

which the following was the refult:

"Dung of every kind did not occasion any perceptible difference. The infected seeds which he sowed, and from which the black corn was to grow, produced as many distempered plants in the beds, which were not damaged as in those which were. He has not observed, that any kind of dung, either forwards or prevents the progress of this dittemper.

"Dung made of straw which had borne burnt ears, did not seem to communicate the distemper; but straw infected therewith, and not rotted, did seem to produce it. The injury was still more perceptible when the burnt ears and the powder were

mixed with the earth.

"All the grains naturally spotted, whether they had been gathered from off the same ground, or brought from a considerable distance, either of bearded or of smooth wheat, or of spring corn,

prouced a great many burnt ears.

severe afterwards walhed, and all a

"Chosen wheat, taken grain by grain out of picked ears, in order to be the more certain that there was not any distempered grains among it, being sown, some in dunged land, and some in such as was not dunged, without having been prepared, produced at most but very little, and sometimes not any black grain.

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"Sound grains chosen in the same manner, and afterwards sprinkled with the powder of burnt grains, produced as many black ears as grains naturally spotted.

"Chosen grains free from black, after being steeped in a lye made with lime and sea salt, produced fewer distempered ears than other similar

grains fown without this preparation.

"There were still fewer distempered ears in the beds which he said had been prepared with quick lime and salt petre."

It is added, that the circumstance of sowing late or early, never seemed to be of any conse-

quence in these trials.

It is proved from M. Tillet's experiments which he repeated several times, that the powder of the burnt ears is contagious, since sound grain smeared with it, or sown in surrows where it had been strewed (he says) produced a great quantity of distempered ears. He adds, that he found this contagious powder did not lose its bad quality, even when exposed to a heat of sixty degrees of Reaumur's thermometer, but that it must be quite burnt before it would cease to infect other grains; for that otherwise it would keep its noxious quality for years as strongly as at first.

According to this plan, those farmers who wash their sacks into which their seed-corn is put, do very right, lest, if the sacks were daubed with this powder, they might infect part of the sound grain deposited in them. For the same reason he advises the seeds-man to be careful, that none of the powder, when he sows, be lodged upon his hand or his

basket.

This gentleman fays, it appears to him, that fuch plants of wheat as are attacked with this diftemper, are more eafily affected by frost than those which which are found. If so, hard frosts must be of great service in this case, because at the same time that they destroy those distempered plants, they will enable the earth to afford the more nourishment to the sound ones; and the crops, when reaped, will be free from these infected ears which do them so much injury.

It is observed likewise, that the black powder so contagious to wheat, does not in the same degree affect rye or four-rowed barley; and another observation is, that Smyrna wheat is less susceptible of this distemper than any other grain; but that spring wheat is very likely to be damaged

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Though we have already given an accurate account of some experiments tried in England, which come within our own knowledge, and the refult of them, yet as these did not always answer alike, the burnt corn fometimes producing the fmutty, and vice versa, and sometimes a number of sound ears, which were quite found, while the foundest and most vigorous feed sometimes produced distempered grain. On these accounts we have thought it proper to introduce the experiments of fome ingenious followers; we shall now, with the same ingenuous candour, proceed to give the conclusions generally drawn from them, whereby it will be judged, whether these latter were more fatisfactory.—I shall fubjoin felect remarks on some other kinds of diftempers in corn, not hitherto separately noticed, with which I shall conclude this chapter.

The conclusions which are drawn from M. Tillet's experiments are generally said to be the fol-

lowing:

1. The defect which the black powder communicates to feeds, appears only to be superficial, and

does not affect the internal organs of the grain, be-

fore it is put into the earth.

2. Therefore whatever contributes to remove this powder from off the furface of the grain, will equally conduce to preserve corn from that distemper.

3. Grain perfectly free from all infection of this burnt, carious, or rotten grain, will not produce

plants attacked with this diffemper *.

4. Grain affected with this contagious powder may be rendered entirely found, by being entirely

cleared of it.

- 5. The action of fifting, and the precaution of washing the grain in several waters, lessen the effects of the contagion; but these are not sufficient to cure it; for a great many burnt ears have been found amongst corn which has been washed in several waters.
- 6. Lime, though more efficacious than plain water, is not always fufficient. One reason for which, M. du Hamel thinks to be the method of liming corn, which was formerly different from what is practifed now. The corn used to be put in baskets, which were plunged into hot lime water; it was ftirred well in those baskets, and all the distempered grain that fwam upon the water was constantly skimmed off; by these means all such grain were effectually separated from the found ones, and those last he observed were cleansed much better than they could be by the present method of simply pouring lime water upon a heap of grain, and then stirring it with shovels, or by only applying to it lime flaked in the air, and reduced to powder .-It is added, that a farmer, who was obliged to fow his lands one year with the spotted whear, washed

^{*} This, however, was not apparently the case in some of the experiments tried in England, as before recited.

the feed-corn in lime-water, by immersion, in the manner described, and had not any black grain the

next year.

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7. Washing the distempered grain in several waters, is a good prevention; but we are told it must afterwards be steeped in brine, till it is thoroughly impregnated therewith, and then be strewed with powder and lime.

8. A strong brine of sea-salt is good, and may be used to great advantage where salt is cheap.

9. One part of falt-petre in nine parts of water, will act still more powerfully than sea-salt, and should therefore be used in places where the farmer

can conveniently procure it.

10. Strong alkaline lyes are yet better. Potash, salt of tartar, a lye made of any vegetable ashes abounding in salt; urine becomes alkaline by putrefaction, &c. Of these the easiest to be come at in every place may be chosen to make a lye for seed-corn. The ashes of sea-weeds, &c. are likewise, in this case, very serviceable.

11. As it has been found, that grain chosen with care, or free from black, produce but few distempered ears, the farmer will do well in changing his spotted corn, whenever he has any such, for

found feed, of the growth of other land.

12. Then the result of M. Tillet's observations will be, that if the seed is spotted, it must, in the first place, be washed several times in fair water, till the black is entirely taken off, and then it should be steeped in lye. If it is not spotted, our author says it should be steeped in the following liquor:

"Make in a tub a lye as for washing linen, by putting four pounds of water to every pound of ashes. One hundred pounds of ashes, and fifty gallons of water, will yield thirty-five gallons of lye, to which should be added sifteen pounds of

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quick-lime. This will be fufficient to prepare twenty bushels of wheat. When this lye is to be used, it should be heated to such a degree that a man can but just bear his hand in it. The costs should then be plunged into this liquor in baskets, and be well stirred with a flat stick, like the broad end of an oar. The baskets should afterwards be lifted up, and suspended by poles over the tub, that the lye may drain off into it; and, laftly, the feed thus prepared should be spread upon the sloor of the granary, till it be dry enough for fowing. If it is prepared before hand, it must be stirred and turned from time to time with a shovel, to prevent its heating. With this precaution the feed thus prepared may be kept for a month, or even a lentibly observes, (after having menussias yelohw

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Some wheat, as it is faid, being freeped in this lye at M. Taponat's, near du Rochefaucault, in 1760, the corn produced in 1760 by this feed & was perfectly free from black, while half the crops in the neighbouring fields were attacked with it. It is added, that M. Delu boiled two pounds of falt of tartar in a quantity of water sufficient to fleep an hundred pounds of wheat, which he put into it while the lye was warm, and afterwards fprinkled it with quick lime. dwThe grain being fown on the eleventh day of October, 1255, on part of a field of three acres. The rest of the field was fown with fome of the wheat only steeped in lime-water. No difference appeared in the plants of these grains during their growth; but some days before they were reaped, M. Delu fays he went with fome experienced farmers, and examined them very carefully, found a confiderable quantity of burnt grain in the part fown with the wheat that had been steeped in the lime-water, but much less in the other parts, where the grain steeped in the

lye was fown. From hence the following inference is drawn, viz. that acrid substances are the fittest to

prevent the blackness in corn.

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Before M. Tillet's experiments were tried, the same author informs us, that rather than not have a preparation to steep their corn, they used one of arsenic, by which a number of accidents happened, which indeed is not at all to be wondered at, when the nature of this pernicious drug is considered.—
In this view it is observed, that M. Tillet's discovery must be particularly useful, even if considered only as tending to abolish such a dangerous practice.

Count Ginnani fays, that he has found benefit from fteeping corn in lime-water, but acknowledges, that at some times this has proved ineffectual. He very fensibly observes, (after having mentioned some other methods, such as sprinkling the seed corn with flour of brimstone, stirring and mixing them well, &c.) that he is consident it may likewise be guarded against in a great measure, by deep, good, and frequent plowing, adding, that sarmers should take all possible care to pluck up all the plants that are unaffected with the distemper the moment they see them.

Though some people affert, that the black powder is contagious, while others seem to doubt it, yet it is generally allowed at least, that this is produced by other causes, else it could not be supposed, that burnt grain would ever be introduced at any time, in a country where it never existed before. Be that as it may, as long as there is the least danger of a distemper's being communicative, M. Tillet, as well as others, who have been writers on the subject, are certainly in the right in advising to shun any thing which may be thought to spread the contagion.

Another of the diforders to which wheat is subject is the mildew. This, as M. du Hamel ob-

ferves, attacks the stems and blades of corn which it covers with a powder of the colour of iron rust, when at the height of their vegetation. The substance does not strongly adhere to the blades, but will fall of upon any thing near it, or if a plentiful rain falls, it is known to wash if away. The French call this distemper rust, and it seems to answer to that which bore the same appellation among the ancient Romans.

Dry and gloomy weather happening at the time when the corn is at the height of its vegetation, is generally esteemed to be the chief cause from whence this distemper proceeds. It has often been observed, when a hot sun has succeeded to such hazy weather, that within a few days afterwards

the corn has been mildewed.

Yet this distemper is not common in dry, hot, and clear years; but when the spring has been wet, the finest wheat is in danger of it, which generally appears upon the breaking out of the sun in the morning after close and dry weather, during which there has not been any dew. The rusty powder then gathers upon the blades, in such a manner sometimes as to cover the earth for two feet round. On the experiment being tried of cutting off these blades, the same plants have grown again, and throve much better than those which had not undergone the operation.

Should this attack the plants before their stem begins to rise, it sometimes does but little mischief, if the succeeding season is such as to savour their growth. They shoot out anew, and produce ears, though their straw is shorter, and those ears are smaller than they otherwise would be. But if both blades and stalks are mildewed at the same time, then the farther growth of the plant is stopped, and the grain gets scarcely any more nourishment; by

which means the crop is greatly diminished.

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Some (amongst whom is M. Tillet) impute this distemper to the sharpness of the air in dry cloudy weather, which breaks the vessels interwoven with the substances of the blades, and makes them difcharge a thick, oily juice, which, drying by degrees, is changed into that rufty powder. This opinion is supported by the experiment of examining with a magnifying glass, plants of wheat, the ftems and leaves of which are covered with ruft, when small crevices appear distinctly in the places where the powder is deposited, and from space to space in the membrane of the plants, openings through which the juices, afterwards converted into this powder, may iffue, and over which are to be perceived some slight fragments of the membrane, imperfectly covering the openings where the powder lies.

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" However this may be (fays M. du Hamel) the rust of corn is the consequence of a distemper, the first cause of which is not yet sufficiently known. It is a mistake, however, (continues he) to think, that this and the mealy powder, which may be feen on many plants, are a collection of the eggs of infects, and that this is a fource of other innumerable infects fatal to vegetables. By admitting the extravalated juices as the cause of these distempers, we shall conceive, that the rust of corn, the honey dew, the mealy dew, and all those unctuous substances which are found upon gramineous plants, depend on the quality of the juices concentrated in those plants, upon the outside of which it manifelts itself by evaporation, and is converted sometimes into that impalpable powder, and fometimes into that thick substance, which is red on garden beans, often of a rufty colour in corn, greenish on

the plumb tree, yellowish on the ash, &c.

Count Ginnani, treating of this differnper, expressly afferts, that, by the help of a microscope, he H 2 has

has discovered small worms lodged between the two membranes of the blades.

M. Chateauvieux observed in the autumns of 1733, and 1764, that when the corn was rusted, the same thing happened to the hay; the grass turning from its fine green, to the ugly rusty colour of the corn; it was covered with the same kind of powder, and its quantity diminished sensibly every day; and as the whole of a field of corn is not usually affected at the same time, so this distemper extended only to some parts of the meadow.

"The cause of this distemper is the same in corn and grass, but its effect is not exactly similar. It may destroy annual plants, such as corn, entirely; but in perennials, like grass, it destroys only the leaves or blades. May not the preservation of these last be owing to taking off these leaves or

blades when they are cut for hay?

"As the straw of smutty or mildewed corn (and by the same rule grass) in a similar condition, may possibly give diseases to cattle fed with it, it were to be wished, for the public good, that a parcel of sodder, the most insected with either of these distempers, were set apart for the food of a certain number of beasts. If cows or oxen, for example, remain healthy after having been fed with this growth for two or three months, it may afterwards be given with considence and safety: if the contrary happens, the remedy is plain and easy; feeding them with good wholesome hay, will carry off the disorder, which will be then known to proceed from the badness of the food."

It is observeable, that the warmer countries have more reason to apply the name of rust to this distemper, because it more frequently appears under the form of a rusty powder in such climates than in England, where the air is seldom dry enough to ex-

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hale the moisture of the exfudations of the plants, and reduce it to such a powder; but since the diftemper is the same, and under the latter form, it feems to be completed. I have chosen hitherto to speak of it as rust, and to give the opinions of the

French concerning it.

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Count Ginnani distinguishes two principal kinds of mildew, one of which spots the blades and stems of corn, and dries upon them, yet without ever producing any powder, but penetrates through the outward covering, and entirely dries them up.-This is generally of a pale colour, either yellowish or inclinnig to purple, and fometimes a variegated mixture of colours. The other speedily covers the plant with a moist and glutinous substance, which afterwards becoming dry, turns into a powder of one or other of the above-mentioned colours. The former extends to every species of corn; but the latter is generally peculiar to corn in the blades. Some may likewife reckon a third kind of mildew, or yellowish substance, or powder, fometimes feen under the membrane of the blades of corn, where it raises blisters, makes holes, and corrodes the fibres. The Count is confident, that this distemper is the rubigo of the Latins.

"For the vegetation of feeds, (continues he) after they have been properly deposited in the earth, for their fecundity, their sprouting, and the increase and well doing of the plants produced by them, it is necessary that the action of the fluid which pervades them be duly regulated, for that fluid is operated on them by the same causes which affect the liquor in a thermometer and barometer, or influence the hygrometer; fo that whenever its due course is obstructed or weakened, its quantity too much increased or diminished, or its quality injured in any manner whatfoever, a dif-H 4

is seldom dry enough

temper will ensue. This fluid is subject to two laws of motion; the one simply as a fluid, which consists in an intestine agitation of its minutest particles; the other, as a fluid whose progress is through the various ducts of the plants. By the first of these motions it assimilates to itself all the homogeneous particles, and expels all the heterogeneous; and by the second, it penetrates into the various parts where those functions are to be performed. When both these motions proceed naturally, equally, and justly, the secretions are duly made, and every part of the plant continues sound and healthy; but when that harmony is interrupted, the fluid degenerates from its natural state, and the secretion becomes vitiated and depraved.

" Now, if the several distempers to which plants, are subject, are owing to the various ways in which the regular action of this fluid may be hurt; and no one distemper can, in my opinion, happen to corn, which will not fall under one or other of these circumstances, we ought to search after, and endeavour to discover them, in order to be thereby enabled to prevent, or to cure them, that mankind may be the less exposed to the injuries resulting therefrom. But, as the knowledge of these particular things depends on an adequate conception of those which are universal; and as the universal causes of distempers are external or internal, and the diftempers themselves seem particularly to depend on the constitution of the air, or an alteration of food, or on both; so when we have discovered the genus of the cause, it will not be very difficult afterwards to find out the species and the efficient So many and various have been my refearches, observations, and experiments, and such the lights which they have afforded me, that if the love of truth did not oblige me to be diffident of myself, and if I were not thoroughly persuaded

with that great philosopher and mathematician, Galileo, That we cannot, in general, understand bow Nature acts, because she makes use of means frequently beyond the use of our comprehension, I should, perhaps, flatter myself with thoughts of having discovered the origin of some of the distempers to which

corn is subject in the blade."

Though this is merely theoretical, yet the great use of being acquainted with the nature of the diftempers of corn, as well as the modest manner in which this illustrious foreigner delivers opinions which he never was backward in improving by practice, were causes sufficient for our inserting the passage from one whom we have frequent occasions for quoting in the course of this work.

He then proceeds to give his farther opinion of mildews, which is, that they come on very early in the morning, and cover the corn almost instantaneously, after a cold night which has been preceded by a hot day; and that the fap, or moisture, which then iffues out of the plant, is gradually exhaled, and forms the rufty powder which cha-

racterises this distemper.

After trying, in vain, all the boafted remedies of the ancients, highly commended by some modern writers; fuch as burning of straw and weeds in a ferene night, when either not a breath of air is stirring, or the wind blows from the west; sticking up branches of laurel, &c. sprinkling the corn with tobacco, and with pepper, and ftrewing among it (as Dr. Hales advites) woollen rags steeped in a strong solution of salt of tartar, or sea-salt, or in good white-wine vinegar; it is concluded that the preference, among all the methods generally prescribed, is due to that of Mr. Worlidge, of making two men go, at a proper diltance from each other, in the furrows, holding a cord fretched strait between them, and carried so as to shake

shake off the dew from the tops of the corn before the heat of the fun has quickened it: to which he adds, as an excellent preservative, keeping the ground free from weeds, and stirring the earth frequently between the plants. Mr. Worlidge's farther observation is, " That sowing wheat early is the best remedy against mildews; since by this, the corn will be well filled in the ear before those dews fall, and the increase will consequently be the greater. For curiofity's fake, wheat was fowed in all the months in the year, when that fown in July produced fuch an increase as was almost incredible. In France, they generally fow before Michaelmas." He adds, "That bearded wheat is not fo subject to mildew as the other, its awns

keeping the dew from the ear."

Mr. Miller fays, " The true cause of mildews appearing upon most plants which are exposed to the east, proceeds from a dry temperature of the air when the wind blows from that point, in which case it stops the pores of plants, and prevents their perspiration, whereby their juices are concreted upon the furface of their leaves; and that concretion being of a sweetish nature, insects are excited These insects finding there their proper nutriment, deposit their eggs, and multiply so fast as to cover the whole surfaces of plants, and by corroding their vessels prevent the motions of the He supposes, likewise, that the excrements of these insects may enter the vessels of plants, and by mixing with their juices may spread the infection all over them; because it is observable, that whenever a tree has been greatly infected by this mildew, it feldom recovers for two or three years, and often is found never to be entirely clear from it after." But he will by no means allow these infects to be the primary causes of this distemper, as fome have imagined.

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With regard to that disorder which we call blights, they may, perhaps, be properly divided into several species, which in various manners at-

tack and affect the growing corn.

The first of these, (as M. du Hamel has reckoned) is that which produces empty ears, or corn of which the ears, instead of being full, plump grains throughout the whole length, are entirely destitute of any at their ends, and contain only a few small grains, in which there is scarcely any flour, and which pass through the sieve with the dust and seeds of weeds.

In some years this accident is common, and then occasions a considerable diminution of the crop, and has been attributed to the following causes:

In the first place, some have attributed the evil to the effect of lightning, and have generally supported their opinion by referring to the great effects of electricity, wherewith, in this fort of tempestuous weather, the air is known so much to abound.

When the corn is in bloom, cold and heavy rains may hinder the grains from being impregnated, in the fame manner as it happens to grapes, which are then generally small and juiceless.

Frost may hurt the young ears of corn when they are just coming forth, in which case good

grain cannot be expected.

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When the vegetation of a plant is disordered or interrupted by any cause whatsoever, while the seeds are yet forming, the grains at the point of the ear, which are last formed, will suffer most, and for this reason it has been concluded, that the best cultivated corn is found the least liable to this accident; because the frequent stirring of the mould keeps the plants in constant vigour, and helps the perfect formation of the grains throughout the whole length of the ear.

The small grains at the point of the ear not being always capable of growing, it seems that the want of impregnation is not the constant cause of the emptiness of the ears, in this fort of distempered corn.—

Another species of the blight, is, that which

produces parched and shrivelled corn.

Corn is faid to be parched and shrivelled when its grains, instead of being plump, smooth, and full of flour, are wrinkled in their outward service. These, indeed, yield good flour; but the quantity of it is small in proportion to their bran, which is as considerable as that of the best wheat. Yet if this distemper does not prevail to a great degree, the grains, though parched or shrivelled, sprout very well, and produce good seed.—The occasions of this evil are generally supposed to be the following:

It can scarcely be doubted but that it is owing to some accident, which hinders the free ascent of the nutritive juices into the grain, when it is almost formed. By such means, the grain which has attained its sull size, but is precipitately hurried on to maturity before its mealy part is perfected, must infallibly be parched or shrivelled, and several cir-

cumstances may produce such an accident.

While the grain is yet in its milky state, if the corn is beaten down, or laid, then the broken or bent stalk ceases to convey the necessary nourishment to the ear; and the grains which no longer receive their due sustenance, ripening without being filled with flour, remain stinted, dry, and shrivelled.

Should great heats come on while the corn is yet green, the stalks dry, and the grains ripen suddenly, without being filled with flour, or, indeed, sometimes without having any at all in them; and in either of these cases certainly they become what

is called parched grain. Late corn, and that which has had the most moisture, are generally the most liable to this accident.—

Wheat fallen, or lodged, before its grains are ripe, in effect produces *shrivelled* corn, and fuch as are wripened by a strong and sudden heat, are accounted

to be productive of such as is parched.

It has been observed, that late ripe corn must certainly lie under many disadvantages, especially in coarfeness. We are referred even to the nuts hanging on the trees in September, though the kernel of the latter is secured by a shell, yet the cold air, dews, rain, &c. even penetrate the shell, and change the colour of these nuts, as well as render them watry, and, in a manner, tasteless. Some farmers, indeed, are pleafed when September is come, because the night's being often frosty at that time of the year, they fay the corn ripens then as much by night as by day. Mr. Lisle, of Crux-Easton in Hampshire, observes, that in the neighbourhood of that estate, indeed, it generally is so. " But (adds he) notwithstanding this observation, with which our farmers comfort themselves, I would not willingly have my corn fo ripened; for, in truth, fuch ripening may more properly be called blighting; inafmuch as ripening implies filling the grain, and somewhat leading to its perfection; but these frosty nights rather shrink and dry up the grain, and stop its filling. In like manner, all forts of fruits may be faid to be ripened by the frosts; inasmuch, as they precipitate to rottenness, &c. My opinion is, that fuch blighted, or frostbitten corn, not being arrived to its natural ripeness, can never have a goodness in its flour like that which is ripened thoroughly, nor be so profitable, though it may appear as big. If harvest proves late, as in the latter end of August, wheat and barley that are then to fill must run thin, and

the same is true of all forts of grain; and in a wet summer, the vale-corn, which usually runs to straw, will keep the ground cold, and prevent the filling

of the grains."

Glazed wheat is a kind of grain which, in plentiful years, is generally rejected, though the defect is not such as is thought of any great consequence in itself. But as men skilled in wheat require it to be heavy, of a smooth surface, and of a bright yellow colour, therefore, if it be of a dead white, they judge that it has been washed; if of a deep yellow, and inclined to be transparent, they pronounce it to be glazed wheat; and in either of these cases, they generally reject it.

The latter defect, like fome others, generally happens to corn that has been ripened by great heats, which come on just before the flour was quite formed.—Mr. Liste furnishes the following

observation upon this fort of grain.

"The colour of corn, (fays he) whether it be of wheat or barley, gives a great preference with the husbandman in a market, which does not a little puzzle the inquisitive gentleman, a stranger to husbandry, who hears it; but the reason for it is this—There is an uniformity between the colour of corn and its weight, and the latter never fails to be accompanied with the former quality, which therefore denotes its goodness. Wheat weighs light, because it has not come to its full maturity. and fo has not sufficiently discharged the watry part, which proceed chiefly from the coldness of the ground, that wanted spirit to carry the grain to a full degree of ripeness; and the defect of colour may be occasioned by too much rain, which fogged the grain in harvest, while standing, or in grip; for being wet and dried again, every time it was dried after being wet and full ripe, the moisture exhaled by the sun's drying it, carried alfo

also with it a tincture of the particles of its colour along with the exhalation of the watry parts; and therefore the grain must be the more porous, less solid, and consequently lighter. The same argument will hold good for barley. All corn is apt to grow brighter as it grows towards earing; but that which then holds the deep green colour, is likeliest afterwards to have the largest and boldest ears,

and to bring the grain best to perfection."

It is likewise observed, that dry weather at the earing time prevents corn from getting well out of the hood; and that, as the Latin writers have observed, rainy weather prejudices all forts of corn at the blooming time, except the liguminous kinds, because the wet falls into the husk of wheat, barley, and oats, which opens at that time, and so is corrupted by the water's standing upon it, whereas the pods of liguminous grains lie within the leafy flower, into which the wet cannot find a passage.

Another species is called abortive or ricketty corn. This distemper, which has been very particularly noticed by M. Tillet, is by him represented as a very salse one. It shews itself long before the ripening of the corn, and sometimes even before the plants are a foot and a half in height. A deformity of the stem, the blades, the ear, and sometimes of the grain itself, are the characteristics

which mark this diftemper. top and is alumed adol

It is mostly seen (as M. Tillet observes) that these abortive plants are not so tall as sound ones of the same age. Their stem is generally crooked, full of knots, and, as they are properly termed, ricketty; their blades are commonly of a blueish green, and curled various ways; their ears retain but very little of the natural shape, and they are meagre and withered, presenting but very imperfect

feet beginnings, either of the coverings, or the

grain.

It is feldom, however, that all these symptoms unite together; never but when the distemper is at the worst. The stems are sometimes pretty strait, the blades not much curled, and the chests tolerably well formed, yet instead of inclosing a small, white, downy embryo at their summit, they cover only a green grain terminated in a point, and shaped like a pea beginning to form in its pod.

They have often two or three distinct points, which make them appear as if two or three grains were joined together at their bottom. When these grains have attained what in others is called a state of maturity, they turn black, and so much refemble the cockle seed, that they have actually

been fometimes mistaken for it.

The following are the observations made upon

this distemper by M. Tillet.

"1. The abortive ears generally grow on ricketty stalks, of a white colour, with curled leaves.

2. The stalks appear ricketty as soon as they

are three or four inches high.

3. While the ricketty stalks are yet low, they are weak and of a yellowish hue; their blades are of the same colour, and somewhat curled, as those of blighted corn generally are; yet the ricketty

stalks often look stronger than the other.

4. As the ricketty stalks grow, they become of a green colour, and afterwards change to that blueish hue which is their distinguishing characteristic; their blades, which remain curled, become likewise blueish, and never have the strength or consistency of sound blades.

5. This distemper is not peculiar to corn that grows in poor ground; it has made its appearance, at some times, in the middle of a tust of sine wheat; whilst at others, it has been sought for, in vain,

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even in the poorest soils, and where the plants were

in the most languishing condition.

6. The roots feemed to partake a little of the fame diftemper: they were not entirely covered with their foft, spungy coat, and in some parts they were grown hard like wood.

7. Ricketty plants seldom bear ears either entirely good or entirely bad: whenever they produce any of the former, those good ears grow on upright stalks, of which the blades are but little

curled.

8. The abortive grains refemble very young peafe, and prefent one, two, or three, very diffinct

points.

9. The abortive grains which usually grow on ricketty stalks with curled leaves, are sometimes intermixed with carious or rotten grains, which proceed from the same root, and grow on upright stalks, the blades of which are not curled.

10. Ricketty plants fometimes bear ears which contain found grains, and others which are abor-

tive.

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11. The abortive grains adhere but very little to the bottoms of their chests or husks; for which reason they shed easily when their coverings are opened.

12. An abortive grain feldom has three membranes like the found, fometimes it has two, more commonly one, and has even been found to have

none at all.

13. The abortion of the grain is sometimes quite completed before the ear comes out of its hood.

14. After the ears of ricketty plants have been exposed to the air for some time, the husks grow white, and the abortive grains grow black and dry.

15. There are fometimes found stalks of wheat which are strait, pretty tall, and have only the

blades of the third or fourth joint shrivelled or curled, though of the ricketty kind. In this case the ear contains,—1. Abortive grains, composed of one, two, or three parts.—2. Abortive grains inclosed in the same chests, with a white grain, which has one or two yellow membranes.—
3. White grains, furnished with three very green membranes, which last seem to promise well.

M. Tillet suspects this distemper to be occasioned by insects, and says, he has perceived on the distempered stalks, where he found insects, some small drops of a very clear liquid, which he takes to be

extravafated fap.

Barren ears are generally long, lank, and white; in some the membranes are dry, transparent, and tough. M. Aimen is of opinion, that this kind of accident happens oftenest to those plants which grow with most vigour, as in them the too great quantity of sap in the blade, or other parts of the plants, prevents the blossoms being duly formed.

It is likewise suggested, that frost may occasion this distemper, and that the sudden, scorching heat of the sun, immediately after heavy rains, may have a similar effect. In which case, this disorder is to be classed with that which renders corn parched or shrivelled, and that which produces

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'Count Ginani, in cases of barrenness in the ear, advises the husbandman to enrich the land, and

change the feed.

Falten, or lodged corn, is another evil often complained of by the farmers. It is not always from the finest, tallest, and strongest plants, that they reap either the greatest quantity, or the best of grain. The stems of corn shoot up nearly perpendicularly, unless some accidents prevent it; the most frequent of these are wind and rain: the stem being supple, bends before the force of the latter,

latter, and giving way before it generally recovers its former polition, by means of its elasticity when the wind ceases; but where much rain accompanies the wind, the ears become loaded with wet, and the stalks which are tender near the ground, consequently break; the plants then cannot rise up again, and if there should be weeds at the bottom of the stems, these will soon overtop the corn, and effectually prevent its rising; but if the stems of the corn are only bent or inclined, and not broken, they will still rise again when the wind and rain are over, and be very little damaged.

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Should the accident of their being lodged and broken happen foon after the ears have done bloffoming, the grains which then receive but little nourithment remain very small, and contain scarcely any thing but bran: then the loss becomes very considerable; besides the injury received by the grain, even the straw rotting upon the ground, and becoming good for nothing. But if the corn be not lodged before it is nearly ripe, the grains will then be only shrivelled, and a tolerable crop may be reaped if the harvest time proves warm and dry; but if it be rainy, such corn will be apt to grow in the ear.

If high winds happen when the corn is ripe, its grains will shed, and its stems will be entangled, to the great detriment of the farmer, and trouble of the reaper, how careful soever they may be.

It has even been sometimes known, that the corn which is only bent rises again, the ears increase and become full of grain, and sometimes it has not been even shrivelled. But in the fallen situation of corn, it is likely that birds may perch upon it, devour the grain, and, by their weight, complete the lodging of the plants. This is the most to be feared. In some respects, the situation before-mentioned may even be serviceable, as wet

cannot

cannot get into the ears when they are bent downwards, as when they stand upright; and their grain, in the former case, will always be sittest for keeping; the bent ears will likewise be less liable to be shaken by the wind; but should the stormy weather come on, and last too long, there is yet another danger, which is, that of their bending

more and more, and sprouting out at last.

It is often the case by those means, that the richest lands, after all the farmer's industry, do not produce the best crops; but this is what human forefight cannot be supposed to be apprised of, and, consequently, human prudence cannot prevent. The husbandman, therefore, plows and manures as well as he can: if it grows too rank, it is fometimes mowed. This method is adapted to check the growth of the plants, and prevent their rifing too high; and this, they fay, answers the defign of guarding against their being lodged; so it may be added, does the turning in of sheep to eat up the luxuriant blades; but by fuch methods, the farmer most affuredly lessens his crop, at least, brings it to a level with a fecond crop, where the ears are always small and light. This is falling into a certain misfortune, in order to guard against an uncertain one. Lest the grain should shrivel, the farmer has recourse to a method which must necessarily render the ears smaller, and less full of grain. Besides, such checks as these retarding the growth of the corn, must subject it to all those inconveniences which have already been noticed to be attendant upon a late harvest.

Corn which grows high, and in a rich soil, is, indeed, more liable to be lodged than that which is stinted. This, however, we are told, is owing only to the weakness of the straw. All that is wanted, therefore, is to give the stems as much strength as possible. To bring this about, the sun

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and air should have free access to them, and the plants receive due nourishment while they are in the earth; as appears by tusts of wheat which grow separate from all others, and are exposed on all sides, being less apt to be laid than those which grow in the middle of large sields of corn. And in this respect the preference is given to the new husbandry.

There are those who give it as their opinion, that it will set the matter of lodging corn in a clearer light, if we consider the use of the leaves and roots of plants, so far as relates to this sub-

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fun and That trees may be killed by stripping them of all their leaves, is what cannot be doubted. That those mulberry-trees whose leaves are not gathered, shourish better than those which have them plucked off, is a fact. Trees also generally make much siner shoots, in years in which there are but few insects, than in those wherein their leaves are devoured by those little animals; many of the small boughs have been known to wither and decay, when their leaves have been eaten up by caterpillars and gnats, during several years successively.

It is however observable, that so long as trees continue to shoot, their fruits do not arrive at maturity. M. du Hamel tried to hasten that maturity by pulling off the leaves, but the fruit suffered by it if it was not full-grown and ready to ripen. In the latter case, the pulling off the leaves was

of service to it.

It may be worth while to try whether a too forward tree may not be made to bear fruit sooner than usual, or the too rapid growth of luxuriant branches be stopped by taking off great part of the leaves at different times. Let a farmer, for example, cut some of his rank corn, and leave the prest uncut, and let him examine in autumn which

ripens the foonest, and has the best ears of that which is not laid.

The leaves are faid to transpire the greater part of the juices of the plant; but it is probable, these are the juices least useful to it, which brings this evacuation to a fimilarity with human perspiration. It is also said, that they imbibe the moisture of rains and dews, and even the humidity of the air. If io, their leaves must be of use particularly in dry feafons, when the chief nourishment of plants is likely to be received from the last mentioned hu-Thus, as it has been observed, in a dry fpring, early corn thrives, and continues to flourish, while those crops which had not plenty of blades before the drought came on, are generally stinted. In such a season then, should the farmer turn his lambs into a field of wheat, still more should he mow it (as thereby he loses the advantage of the sheep dung, and that of their stirring the soil) the furface of the earth, in fuch case, will remain dry, and the corn would not shoot, as may be seen when hay is cut in a dry feafon, the ground being foon parched up; while the grass that remains uncut, thrives, and its quantity increases, not so much from moisture in the earth, fince that on digging is found dry, but, indeed, from the moisture of the air which it is always imbibing.

It has been remarked, that plants growing on the north fide of an eminence, have generally been found to flourish more than those on the south; the reason assigned for this is, that in the former situation, cold condenses the dew or moisture of the air sooner than where the air still retains its warmth; and, consequently, they are less exhausted than by transpiration.

Sometimes the imbibing of moisture may be prejudicial to plants, as when the seasons are cold and rainy, those plants which are screened from

the fun and wind fuffer particularly, because their vessels are choaked with a corrupt kind of moisture, which is inclined to breed rottenness, and often kills them, while those which are in an open exposure are affisted by transpiration, while they receive the benefit of the sun and wind.

After mentioning lord Bacon's observation, that corn frequently does not spindle well, or come rightly out of the hood in hot countries, by reason of the great heat and drought. Mr. Lisse says, that he himself has found, from constant experience, that wet years make the straw of all corn so weak, small, and thin, that it is apt to lodge; whilst, on the other hand, in dry, hot summers, all straw is thick and strong. He adds, that a cold, wet soil, has the same effect as cold, wet weather, and says, "The straw in wet years runs the coarser, and that in dry, hot years, the siner; in which last case it has the more spirit in it, which is the reason why in hotter countries than England, the cattle eat straw so much better than with us."

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It appears, that if any benefit arises from pulling off the leaves of too vigorous trees, for the same reason, those of too weak plants ought to be taken particular care of; as these organs of transpiration are extremely fit to revive the motion of the sap.

The cutting of lucerne, indeed, may be alledged as doing no harm. This (my author observes) is true, because that plant shoots its roots so deep, that it draws nourishment from moisture little exposed to be carried off by drought; yet if the lucerne be mowed very frequently, or eaten close by cattle, it will be found to lose its vigour, and to vegetate much more slowly than when it is cut at due distances of time; for the supply of moisture, furnished by the leaves, being thereby for a time cut off, the foil is soon exhausted of its humidity, and the plant decays. It is generally allowed, that the moisture

moisture taken in by the leaves of a plant vegetating and in vigour, is partly conveyed to the roots, and transpired by them into the soil, which it moistens so as to facilitate the farther extension of these roots, and that in such a manner as that it may soon be taken up again by the roots of the plant. To strip a tree of all its leaves, when it is full of sap, always directly binds the bark, which does not loosen again till a new growth of leaves gives a fresh circulation to the juice. Thence a

manifest stop to vegetation arises.

" It is evident (concludes my author) from the above-mentioned instance of the strength acquired by a tuft of corn growing by accident fingle, that the want of strength is a principal cause why corn is lodged. When the feed is fown thick, the plants come up weak and tall, circumstances which contribute to their being beaten down. The farmer who knows the richness of his soil, should therefore 1/ fow in such a manner as to allow room for each plant to acquire its proper strength, and that this will effectually answer the intended purpose, ap-, pears by many inftances in the foregoing experiments. It might likewise be confirmed by the example of a very intelligent husbandman now living, who reduced his feed for rich ground to lefs than two bushels per acre, and had plants, loaded even with beavy ears, which refifted winds and rains that were fufficiently strong to lay that of his neighbours in the adjacent field,"

Having thus recounted the conclusions relative to distempered corn, and most of the experiments of any note made in our modern days to prevent it, what will the candid reader, or the judicious husbandman, conclude from the result of all that has been said? It is to be allowed, that in the course of the enquiries I have referred to, many

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ingenious conjectures have been formed, and even some useful truths brought to light. Yet can any one fay, that a certain method has yet been hit upon by any preparation, mixture, or fumigation whatfoever, which can absolutely insure fertility to the grain, or even give us an affurance that it will not be fmutty, mildewed, barren, or otherwise diftempered .- It appears not .- Even the number of various, and sometimes contradictory, methods proposed, evince the contrary. Were there such a remedy, in either case, it would be simple, it would be almost universal; as that is not the case, we may reap much advantage from the accidental discoveries of such gentlemen, or farmers, as have investigated this subject, but we must depend little upon their inferences .- The experiments first recited in this chapter have led me to conclude fo .- If it be asked, why then I have given a detail of what others have written or faid upon the subject. I have already partly answered it. Besides, it was but fair to give the opinions and experiments of ingenious foreigners, and others, as well as my own, without which a just comparison could not be drawn.-Indeed, this is the method which I have prescribed to myself, and which I shall follow through the whole of this work.

To sum up this article. It appears that most of the prolific liquors, steeps, &c. are entirely use-less. The common use of lime has seldom been outdone, except in some sew instances, by urine, and such preparations as have been seconded by frequent applications drawn from dung, by way of watering, &c. Nay, even such crops as have had all these advantages, have not always answered the expectation.—The distempers of corn have scarcely ever yielded to these, where there were not other circumstances to which its soundness might be attributed. The sew instances of the contrary that

have

have occurred, ought not to be reckoned in the course of argument, as on a second trial they have generally failen.—As to mildews, and the last mentioned disorders in plants, whether they arise from insects or not, they generally induce them; and by repeated experiments, which depend not on mere speculation, it is certain they are owing to the bad qualities of the atmosphere; and after all the care I have taken of particular crops, I have found a sheltering hedge stand me in more stead to protect the rising plants from some of these injuries (particularly the mildew) than any thing that lay in the power of man to effect.

Upon the whole, it seems that the causes of the different products of corn, and its various distempers, are in a great measure a secret which Nature has hidden from us, while she has, however, revealed this great truth: "That whatever temporary disadvantages the farmer may suffer, a good choice of soils, the proper plowing, stirring, and manuring of the ground; or, in effect, real good bushandry, in the end, will triumph over them all." Speculative notions should, by no means, be rejected; but they should be considered as no farther useful,

than as they may be reduced to practice.

I have begun with these articles, (which otherwise I might have postponed) merely in order to clear away all obstacles, before I proceeded to speak directly of the culture of wheat, &c. which will be the subject of the following chapter.

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cultomary period.—Promath larger end of July in the middle of October, in different followhentime, be properly lown; but (all other curcumits were parts A.A.A.C.) that generally increeds both which is ear

C H A P. VI.

Of the Culture of Wheat, with general Observations on sowing of Grain, and some particular Experiments relative to Wheat.

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WHEAT is a kind of grain, which, as it is most necessary to the support of nature, so it has been generally observed to grow in almost any part of the world, thriving not only in temperate climates, but often likewise in those which lie under the extremes of heat, as well as in cold regions, and even when sown where it has never been known to have grown spontaneously, seldom fails to succeed.

Wheat is commonly fown in autumn, and when the ground is moift. In high lands, it is generally put into the ground in August, and people are often employed to sow in one place, while they reap in another. But in low and strong lands, the farmers are often later with their crops, thinking the month of November early enough for the operation, nay, some defer it till Christmas. Notwithstand this, experience evinces upon the whole, that late sowing is by no means advantageous, the wheat not only being apt to run up to too much straw, but also to be forced out of the ground by frosts, as has already been noticed.

But the general circumstance to be attended to, is that of the moisture of the ground; so that if no friendly showers have fallen, it is reckoned best to defer the sowing the seed for some time beyond the customary period.—From the latter end of July to the middle of October, in different soils wheat may be properly sown; but (all other circumstances being alike) that generally succeeds best which is ear-

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lieft fown, if the foil be kept in a proper degree of tilth and culture.

The early fowings mostly require less seed than the late ones, the plants then rising better, and acquiring more strength to resist the winter's cold.— More seed is, however, advised for the poor land than for the rich, on account of a great number of plants perishing on the former. In consequence it is concluded, that rich lands, sown early, require

a less quantity of feed than any other.

The quantity of grains which any particular measure may contain, must always be attended to by the husbandman, left he should fow them too thick or too thin, the former of which circumstances is frequently the case, and the plants, by being thus too much crowded, are confequently hurt in their growth, at the fame time that the owner felicitates himself on having his ground covered with the blades of corn by the beginning of fpring.—There is one particular advantage, undoubtedly, which is the consequence of not sowing over much feed; namely, the preventing the corn from entangling or lying flat .- Those who have frequently croffed corn fields, have often observed the plants standing erect by the sides of the paths, when, in the rest of the field, it has been laid, owing to its peculiar thinness in the former places.

From half an inch, to that of three inches, is the usual depth in which wheat is planted, according to the nature of the soil, the stiffest lands requiring the shallowest sowing. The general custom is, to sow it under surrow, where the soil is shallow, to prevent its being thrown out by the winter frosts, or the roots being laid bare by the winds of spring. But some sow in broad-cast, either with a single cast or a double one, harrowing once between them; after which the ground is again

again harrowed several times, in order to cover the seed. In this latter case, there is danger of its becoming the prey of birds; in the former, it is more liable between the grain and the blade to be eaten

by the worms of the earth.

Of all the winged inhabitants of the air, there are none more troublesome than the rooks to the corn, when it is shooting up. These presently perceive its sprouting, even sooner than the husbandman, and pick it up. But if they are carefully kept off the ground for the space of about ten days; the blade being grown up, and the grain exhausted of its substance, they will not prove injurious. Nor do they generally molest the wheat that is sown about Michaelmas, on account of their finding so much grain scattered above ground, the remnants of the harvest, without taking the pains to search under ground for such as has been newly lodged in the soil.

Weeds should be carefully kept off the land.— Most farmers are too negligent in this particular. Annual weeds may foon be destroyed, if taken in time; but if neglected, will spread themselves over the ground, so as to prove extremely difficult to be moved. The method of fuffering the weeds to grow till the corn begins to ear, is a very bad one; if it were only for this simple reason; that then all the lower ones are hidden; only fuch as are tall will then be cut down, and many of these, if the people employed are not very careful, will escape, by their intermixing with the stalks of the wheat; besides, that great numbers of the plants will generally be broken and trodden down by fuch as perform the operation, a circumstance which is certainly detrimental.

It has been advised by Mr. Miller, that, in order to obviate these inconveniencies, the method practised by those who tend kitchen gardens should be

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adopted, which is that of clearing the ground with a small hand-hoe, which, if used among the wheat early in the spring, before the ground is covered by the blades of corn, he observes, will effectually eradicate the weeds, especially when the work is done in dry weather, because, being small, they foon wither away. But should the ground be very full of weeds, it is proper to go over it a second time, about a fortnight after the first, in order to cut up fuch of them as may have been too small for notice before. This method is advised, to keep the corn free from what would rob it of its due nourishment; and being properly used, is likely to prevent new weeds from fpringing up again foon enough to do any material injury, as the ground will be fo much shaded by the corn, that the weeds will be pressed down in such a manner, as that before harvest their feeds will not have time to ripen.

Should even a few of the plants of corn at this time be cut up where they grow too close, Mr. Miller is of opinion that it might be useful; and adds, that he has found the utility of this method

of proceeding confirmed by experiment.

Yet both Mr. Miller and Mr. du Hamel blame the practice of those who turn hogs in among the wheat, in order to destroy part of it when it grows too thick, or sheep to eat it down when it seems too rank, the reasons for which, on their principles, have already been assigned in a former chapter.—

When the wheat is ripe, its ftraw turns yellow, its ears heavy, no greenness appears in the middle of them, and the grain when bitten is hard.—From four to five quarters per acre is generally a good crop; but greatly may crops be improved by proper culture and good husbandry, insomuch that an increase, almost incredible, has sometimes been procured by a proper attention in the farmer.

Wheat

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Wheat as well as rye is cut fometimes rather before it is quite ripe; some think this the most eligible method, among whom is M. du Hamel, who observes, that in this case the wheat will harden in the sheaf; whereas if it be suffered to stand till it is too ripe, it will be likely to shed greatly in the cutting, binding, and carrying home. It is to prevent this inconvenience that a good husbandman ties it in the evening, and carry it off early the next morning. Pliny observes, that the ancients reaped their corn before it was full ripe. Some disadvantages have certainly been found to attend the overripe wheat. In particular if fuch wheat takes wet, the flour is greatly impaired in quality, and leffened in quantity. But when corn is cut rather greenish, it will bear some wet without any damage, as it will not imbibe the moisture in such a manner as to be injured, but, in a measure, rather feed by it, which is by no means the case with the ripened ears. And if the grain be in any degree blighted, there is little doubt but that the fooner it is reaped the better, as the stalk fails to give it the proper nourishment, and therefore it is more likely to be fed by lying in the ear. " The straw (adds my author) would become more and more brittle, by standing till the corn were ripe, and the grain comes the more clear from the hulk when threshed, if the blighted fort be cut early."

An acre of wheat may generally be reaped in a Rean day by one man, with a binder, where the corn and stands favourably; pease, vetches, &c. may be Deem cleared in about the same proportion, and rather more of rye, which, however, in many respects as to the culture, &c. is fimilar to wheat, intermixed with which it is fown, as has before been observed

under the name of Mellin.

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About five shillings per bushel is generally rec. koned the medium price of wheat in this country.

It is reckoned that when it is above fix shillings, the poorer fort can by no means afford to purchase wheaten bread at all; and when it is under four, the farmer complains that he cannot pay his rent, and get a living profit. A bushel of wheat

generally weighs from fifty to fixty pounds.

M. du Hamel, speaking of the proper time for harvest, observes, that the husbandman cannot have a more favourable feafon for getting in his harvest, than hot and dry weather; the quality of the corn being then improved, and rendered much more fit to keep, by the fun's having acted powerfully upon it, either towards the latter part of its standing, or just after it has been cut; though he allows, on the other hand, that this very circumstance renders the ears more apt to shed their grain; and where this happens, the value of the fowing is fometimes loft. To prevent this as much as possible, the corn is first laid in grips, and then tied up in sheaves, in the cool of the evening, or early in the morning. "As to the mowers of oats, (fays he) they often over-work a part of the night, in order to avoid the fultry heat of the day. These poor people are obliged to stoop to their work at most, to the very point where the rays of the fun are most violently reflected by the earth, breathe a perfectly burning air that occasions them to drink plentifully of liquors, which, being heated by the fun, allay their thirst only for a few moments, and I strongly suspect often occasions severe illness.— The inventing a machine, engine, or instrument, by which the hardness of this labour might be mitigated, would therefore be a truly valuable discovery."-

The two usual ways of cutting down corn are either with a fythe or a fickle. The former is generally used for oats and barley, or sometimes for very thin short wheat, and the sickles commonly

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for the reaping of tall thick wheat and rye, and the former dispatches so much more work than the latter, that the expences is generally in the pro-

portion of five to two in every acre-

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The mower labours in every part of his body, and his labour requires greater dexterity than the reaper's. However, the former being always in a standing posture, has the advantage of being refreshed by every breeze of air which the latter cannot have.

M. du Hamel, after having observed that he wishes to see some engine invented to relieve this extraordinary labour, proceeds to give an account of M. de Lille's method of mowing wheat, with which, not being matter of mere speculation, but

of real experiment, I shall present the reader.

" The year 1751 (fays he) was very rainy, our grass rotted upon the ground, our corn was poor, and infected with weeds, and the weather continued extremely bad during all the harvest season. One of my fields, containing about fifteen acres, was in particular in fuch a wretched plight, that I did not think the crop was worth taking up. However, after walking over it, and viewing it on every fide, I found that the quantity of grafs, and other growths upon it, might, if mowed, afford a great deal of fodder, which would make me some amends for the total loss of my lucerne. I therefore determined to let my horses have it altogether, with the little wheat which appeared here and there.— This first made me think of mowing a field of wheat. Accordingly I fet my mowers to work, my field yielding a great quantity of fodder, the grafs mowed within two inches of the ground that came up anew, and afforded excellent pafture; and lastly, my bailiff, more saving than I had been, ordered the truffes to be threshed, and got out of

them as much wheat as was yielded by other

grounds.

"Whilst I was congratulating myself on the success of my operation, by which my horses and cattle were provided with plenty of fodder for the next winter, I learned that the husbandmen in Hainault, Flanders, Artois, and other adjacent parts, never cut down their corn otherwise than with a scythe; but at the same time I was informed that they did not mow their wheat in the same manner as their oats; that the scythes were not made alike for both these works, and that there were some other essential difference.

"These observations were a sort of proof that the practice had been found to answer, since it was still continued; and I concluded, that if my operation, imperfect as it was, had succeeded so well, I might expect far greater advantages when it should be performed regularly; but, not to be too strongly prejudiced in its favour, I resolved to make a trial

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upon about thirty acres only.

"Within a few miles of me I found a husbandman who came from the province of Artois, and
had been used to this very business. I talked with
him. He told me how the work ought to be done,
pointed out its intended advantages; and I retained him for my intended next year's mowing of
wheat; but as the season was pretty far advanced,
and there was not time to procure from his country
other people equally well acquainted with the practice, to follow the scythe, and do the whole compleatly in every respect, he instructed two young
lads as well as he could. In short, nothing was
wanting but mere matter of form, by the neglecting
which some of the lifts of the corn were misplaced,
so that there were ears at both ends of the sheaf.—

"My experiment was made upon three pieces of wheat, of ten acres each, fituated in much more extensive

extensive fields of the same corn, so that there was the fairest room to make a just comparison between the operation of the scythe and that of the sickle,

"Some of the neighbouring husbandmen had the curiofity to see the work performed, and were surprized to find that less corn was shed in this way than in the common practice of reaping with the sickle. They thought the method good, but made some objections to the particular circumstances, in which the experience of subsequent years shewed that they were wrong; their entire approbation then followed, and their mowers finding that they should, by this method, be able to cut down all their corn without the affistance of strolling strangers, who often do their work very badly, gladly learned the new method, and recommended it to others.

"The trial succeeded so well, that I resolved to cut all my crops in the same manner; and that nothing might be wanting to perfect my mowers in this practice, I procured a sufficient number of expert workmen, masters of the art, from the village of Trie, near Valenciennes, to assist and instruct

them for the harvest of 1753.

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"This work required a precaution which has been duly attended to ever fince; it is to pick the stones off from the land every year. The expence of so doing is a very trisle, compared with the advantages attending it. All the roads around my land, which were formerly impassable in winter, were now firm and good, fit for any carriage. We now no longer hear of horses lamed, or waggons overturned by them; and, which is equally true, I find that now my land requires a less quantity of seed.

"I have now practifed this method in an extensive manner during five successive years, in the course of which I have had opportunities of experiencing every circumstance necessary to be considered.

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fidered in order to determine its real merit, I mean, mowing in rainy weather, and cutting corn either bent, laid flat, totally lodged, or lodged only in particular places, and in various directions.—

"The Flemish mowers whom I employed in 1753, brought with them scythes exactly like ours; so that I found I had been misinformed by those who had told me in 1751, that this work required an instrument different from that which is used for mowing oats. It was not till the year 1755, that an ingenious workman pointed out some very proper alterations which have since been made.

This intelligent mower observed, that the common feythe would not fuit any ground but fuch as had been plowed flat; that it therefore was most improper for our lands, which were plowed in ridges of ten or twelve furrows, raifed very high in the middle, and that the hooks broke the straw, plucked off numbers of ears, and did not lay hold of many short plants growing in the bottoms of the furrows, whereby a loss must be occasioned, nor could take up the intermixed grass and weeds so exactly as might be wished. In order to remedy this, he took a fcythe fix inches shorter than those which are commonly used, and, instead of the hook, substituted what he called the bender, confifting of two shoots of willow, or other green wood, placed femicircularly upon the handle of the feythe, where the hooks are commonly fet. To this end there must be four holes in the handles, so that the end of one twig may be put into the lowermost hole, and its other end into the third, and the two ends of the other twigs into the fecond and fourth holes .-

"When a mower is to cut down a crop of oats, he places himself so that the corn is at his right hand, from whence the action of the scythe throws the wavings towards the left. The mower of

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wheat, on the contrary, proceeds from outfide to infide, so that the corn which he is next to cut is always at his left hand, and that which he has just cut being collected by the bender, is rested, inclining a little against the adjoining uncut part.

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"Either a boy of twelve or thirteen years of age, or an elderly woman, following the mower as a helper, at the distance of four or five feet, with a reaping-hook, or a stick, from a foot and a half to two feet long, and by putting that through the interval between the sloping late cut wheat, and the standing corn against which it rests, takes up the former, gives the straw ends a gentle stroke or two upon the ground, to form that parcel into a grip, and lays it down at his right hand. This must be done very expeditiously, because the picker-up (as this person is called) is followed by another mower; and it should also be done dextrously, as the greater or less quantity of gleanings will depend upon that circumstance.

"The posture of the mower (continues this gentleman) is of such importance, that I think myfelf happy in having taken particular notice of it. In cutting grass and oats, the mower goes in such a manner that his feet, which are moved alternately at each stroke of the scythe, describe two parallel lines. But in the mowing of wheat, the mower's track should be upon a single line; so that his right foot, which is to be foremost, be driven forward by the left at each cut of the scythe, not unlike the attitude of a fencer when he advances.

"An accident which was likely to have overset my whole operation in the year 1754, demonstrated to me the necessity of this different posture. I employed for mowing my wheat seven men, who were used to come yearly to cut down my oats. On the third day of their labour, sive of them fell sick; on which I set three others to work, but the conse-

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quence was, that I had ten fick people at the end of the week. I visited them, and enquiring into their ailments, found that some of them had a fever, and that all complained of violent pains under their left ribs. At first, I was inclined to think them pleuretic; but, upon a closer examination, and on considering the nature of their work, I perceived, that the illness proceeded from hard labour badly managed, the stress of which had been made to lie chiefly on the left side. I therefore ordered

them to take proper reft.

"On visiting my infirmary, the next day, I found that two of the mowers were returned to their work. I went out to them, and faw, even at fome distance, that their posture was the same as if they had been moving oats. This immediately shewed me the cause of their disorder. The scythes which they then used had the common fort of hooks, and were confequently much heavier than those with wicker benders. I took up one of them, put myself in the posture of a mower of oats, and shewed them that a much greater weight rested upon the hook of the fcythe when they mowed wheat than when they cut oats. It was not possible for them, in the posture they had chosen, to mow that increased load to the left, without an irksome twifting of the body. Then throwing myfelf into the attitude of a fencer, as I had seen my Flemish mowers do the year before, I demonstrated to them, that the body was thus put into a posture wherein it was enabled to exert the greatest strength, when, by the motion from right to left, it had the greatest load to support, and that by the same means this load was carried round without fatiguing the ribs of either fide. My man took up his fcythe, tried as I had directed, and, being convinced of the truth of my demonstration, taught

his companions the same method, and they did

their business easily ever afterwards.

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"Such is the manner in which this operation should be performed, when the corn stands upright, that is to say, in the most favourable years. It ought to be added, that the mower should take care to place himself in such a manner to his work, that his left hand may be towards the wind. The corn is then naturally inclined over the scythe, and is the more easily cut close to the ground. The resistance of the wind, how little soever, helps to keep the corn which is cut, steady upon the bender of the scythe, and facilitates the motion, which rests it against the uncut corn, where the bender takes it.

"The mower is not hindered from mowing close by the wind's blowing at his back; yet the corn that he cuts will not be so exactly collected by the bender; some of the ears will be a little scattered; but the greatest inconvenience is, that it does not rest so well against the standing corn, but is often blown down, which renders the binder's work more

troublesome, and occasions great gleanings.

"When the wind blows in the mower's face, it is in a bad corner for him; it then occasions much loss of stubble, and a great dispersion of the ears.

"But the worst of all winds is that which blows upon the right hand of the mower, the stubble then remains long, and so great a quantity of ears lie scattered, that one would scarcely think the ground had been harvested.—My mowers did not place themselves in this manner of their own accord, but I made them do it for a quarter of an hour, in order to try the effect, of which I am fully convinced.

"When the corn is bent, the mower takes it in the direction of its bending, from left to right, which has the same effect in calm weather, as if the wind blew towards his left. "Lodged corn cannot eafily be mowed inward, because the binder would be perpetually hindered by the entangling of his grip with the uncut corn. A good mower judges by his eye, which part it is most proper to begin at, and takes advantage of the wind, when it can be of service to him. The method which I have seen most commonly practised has been by taking the corn in the direction of its bending, and throwing it in waves. The work thus done is neatly performed, no remains of stubble are seen after the mowing, but the field looks like a meadow.

"When corn is laid entirely flat, it is then most difficult to cut well. I have known the mowers take it in every direction in which it was beaten down, as if the wind had been constantly at his back, and by such means he has contrived to cut as close as if it had been only lodged. My wheat was in this condition in the year 1757, and was mowed very regularly, but the work was somewhat longer about than it generally is in other

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" The preservation of my fellow-creatures (adds M. de Lille) is so dear to me, that I look upon the means of lessening their excessive hard labour, at a time when the heat alone is enough to overpower them, as the first and greatest advantage resulting from this method. Now I find that a good reaper with his fickle can scarcely cut an acre of wheat in a day, let him toil never fo much, whilft the mower will dispatch from an acre to an acre and half, or even upwards of two acres, according to his skill and dexterity. I have, indeed, met with but few able to exceed two acres, when they have done their business well; but we may reckon that a good mower, taking one with another, and the corn as it runs, upright, lodged, intangled, &c. will clear an acre and a half, or perhaps an acre

and three quarters a day neatly, and without wasting any of it. This mower does then three fifths more than a reaper can. It is true, he has not the grips to tie up, because the person who follows him does that part; but he is obliged to whet his fcythe when he comes to the end of the field, and still oftener where the corn does not grow thick; befides which, notwithstanding all the care that can be taken to clear the ground of stones, not a day will pass without his meeting with some, which will oblige him to have his fcythe new hammered; and laftly, when he has finished a row, he must go back to the other end of the field before he can begin a a fresh one. All this takes up at least as much time as the reaper's binding up what he has cut; and in regard to the hardness of the labour on each fide, I believe every one who rightly confiders the nature of their respective work, and their postures in working, will allow, that the mower's toil and fatigue is three fifths less than that of the reaper.

Another circumstance, well worth attending to in this method, is, that the mower is not exposed to those injuries from thistles, thorns, and other ruinous plants, which often prove fatal to the

reaper.

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From the first of these advantages result several benefits. I. A greater riddance of the necessary work. Not a year passes without the husbandman's experiencing, that some part or other of his corn ripens too suddenly, and this unexpected maturity being exceedingly heightened by delay, occasions a great waste by the shedding of the grain, both when the crop is reaped with the sickle, and in loading and unloading it when carried home; whereas the scythe, by clearing in two days a field, which could not be reaped in less than five in the common way, guards against that excessive rpieness. 2. This method of cutting down the corn,

requires fewer workmen; though it may be objected, that a mower and a binder are necessary in this way, for what the reaper alone does in the other. But I confider, that to harvest ninety acres of wheat, I must employ ten men at least twenty days with the fickle, while feven mowers, and as many binders, eafily do my business in ten days. The difference then is equal to fixty days work of one man; and if I do not intend to get my harvest in quicker with the scythe than with the sickle, I take but four mowers and four binders, in all, eight persons, of which the four last stand me in less expence than three reapers, because I employ for this business young people, who would not be strong enough to reap with the fickle; confequently I have two workmen the lefs, and fome advantage in the comparison between the grown up man, who has a higher price, and the lad who answers my pur-3. The thus employing of children, old women and men, whose constitution is not robust, would be an advantage to the inhabitants of the place. Almost every parish would find within itself hands enough to get in its harvest, without being obliged to employ accidental paffengers, who often work badly, require exorbitant wages, and fometimes leave their mafters in the middle of the harvest, if they do not submit to their unreasonable demands.

But let us leave speculation, and notice some advantages which are evident beyond contradiction. In the first place, it is not a small one to have a great quantity of straw, and the straw intermixed with the fodder more easy and oftener than when the corn is reaped in the usual way. Every one knows, that the scythe cuts as close to the ground as the mower pleases. Experience has shewn me, that the stubble has not been left two inches long upon our mowed fields, when the stones have been carefully

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carefully picked off; while the fickle generally leaves it eight or nine inches long, and fometimes much more, when the ground is infested with thiftles, and other flubborn growths, which make the reaper lift up his hand to avoid them. The ftraw is therefore plainly fix inches longer when cut with the fcythe than with the fickle; a difference that may be valued at a fixth part more than that which is usually reaped in the common way. condly, The green fodder in the mowed fields shoots up afresh when cut, and affords excellent pasture after the corn is taken off. The same demonstrative evidence as before, will again take place here with those who consider that the reaper, leaving the stubble either eight or nine inches long, takes off only the very tips of the grafs which chances to be within his grip, fo that being then near the time of its maturity, it ripens its feeds, fows them, and withers away. Whereas, when the fcythe cuts it within two inches of the ground in its greenest part, the yet remaining eyes, and the crowns of the roots fend forth new shoots, which form a good after-crop for cattle. Thirdly, The pasture upon fields, mowed with the scythe, is attended, in my country, with an advantage in regard to the cows. We find every year, and I have always taken particular notice of it, that our cows cease to yield milk during the first week of their feeding among the wheat stubble. I take the reason of this to be, that the stubble gets into their nostrils, pricks them, hinders them from feeding, and makes them range the whole field over in quest of grass, unattended with this inconvenience; so that they spend their time in running about without grazing. I do not find that this accident happens to cows which are turned in among the short stubble cut by the scythe; the grass then soon shoots up anew, and yelds plenty

plenty of pasture, especially if a little rain happens to fall after harvest.

"From hence it refults, that the husbandman is enabled to feed more cattle than he could otherwise do; to save his sainsoin or lucerne, and to have a greater quantity of dung, as I have experienced with almost incredible success.

"I now proceed to the objections, which I shall flate in the same manner as they were made, that is to say, as each year gave room for one or other of

them. The principal are these that follow:

"The first was, That the scythe must make the corn shed very much, as shaking it considerably. To affirm the contrary may seem paradoxical; but the affertion will be proved from manifest principles and by facts. To judge rightly of my proposition, it will be necessary for us to compare the operation of the scythe with that of the sickle, both of which I have examined very attentively.

"The reaper presents his hand to the corn, and with wide extended fingers grasps as much as he possibly can; after which, to bring the lower parts of the stalks so close together, that the sickle may encompass the whole of his grip, and at the same time to give it a position, which renders the action of the sickle more certain, he gives it a violent shake, and, at that instant, cuts it. The grip thus cut, is generally intangled with the standing corn; or the reaper, when going to lay it down, finds that he has missed cutting a stalk or more, which he then breaks with a jerk of his hand. Thus several shapes precede that of the corn when it comes to be tied up.

ready explained the mechanism of its operation, and shewn that the corn cut without any violent shake, is carried gently by the bender upon the

fcythe

fcythe to the standing corn against which it rests inclined, till the binder takes it away to tie it up.

" To prove my proposition by facts, I shall give the following instance: - After my wheat was mowed in the year 1752, in the manner before related, upon the three feveral spots of ten acres each, which were parts of much larger fields, I went, with four other persons, purposely to examine with all the care we could, what quantity of grain might have been shed by the mowing. found none at all in the two first mown pieces, but a great deal in the other parts of the fame fields which had been reaped with the fcythe. In the last piece, which was not cut till the corn was. riper, we found a little grain in the mowed part, but incomparably more in the other. I did not, indeed, repeat this fearch every year with the fame care, because I had not always the same conveniences of making a comparison; but I have seen enough to be certain, that no grain is shed unless the corn be exceeding ripe, and that then much less is lost by the scythe than by the sickle.

"The following more important objection was afterwards made by a fensible husbandman. He, observed to me, that in a rainy year the corn cut after this manner must be more liable to grow in the ear, than that which was reaped in the common way, because the heads of the grips not being supported here by a pretty high stubble, the wet cannot well drain off, and that the grain will imbibe a great deal of moisture from the grass underneath, when the ear is beaten down upon it by rain; which will render it very apt to sprout as soon as the sun shines upon it. I had been told how to guard against this accident, but did not try the method till the year 1756, when it answered per-

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This preservative consists in laying the grips in a triangular form, so that the head of one rests upon the foot of another. The operation is neither long nor fatiguing, nor does it require, in order to do it quick, any thing more than a little dexterity in closing the triangle, by making the foot of the third grip support the ears of the first. The rains which fell during the harvest of 1756, rendering the getting in of that year's crops extremely troublesome; my neighbours had a great deal of sprouted corn, but mine escaped by this method; and what little I had proceeded from, that which remained were mowed when the rains became incessant.

"With regard to the sheaves when bound, my Flemish mowers informed me in 1753, of their practice when they chance to be overtaken by lasting rains: It is to heap upon one another ends to ends as many sheaves as they can possibly cover with one which is then opened, and laid over them. My people did not practise this method, which I believe the best; but they secured my corn by other means which answer well, and are generally known.

"From the above objection, my husbandmen derived another, relative to the difficulty of drying the grass and weeds intermixed with the corn in rainy years, and the danger of housing the sheaves when full of that trash, which may ferment and become the occasion of rotting of a whole pile of wheat. I could not answer this objection otherwise than by my experience. The harvests of 1756 and 1757 were certainly not favoured by the weather; yet all the wild growths which were cut down, and bound up among my sheaves, were well withered when they were housed. No fort of smell which indicated the least fermentation was perceived in any of the barns; the threshers did

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not find any thing like it, and the straw taken from those barns to feed my horses, attested that there

was not any."-

There is another objection, however, which this gentleman observes is the more serious in this case, as he owns he cannot so well remedy it: this is, That the ears of corn do not lie so even in these grips, as in those which are reaped with the sickle; some of them being in the middle, and some at the bottom of the sheaf, so that the corn not being threshed so well or so regularly, and may thereby lose a considerable part of it. Also, that the grass and weeds contained in the sheaves are threshed with the wheat, and the thresher paid for threshing this trash, which again increases the labour and pay of the winnower.

In answer to this, our author observes, that there are, indeed, ears in the middle and at the bottom of his sheaves; but observes, that they seldom are of any other kind than fuch as are termed backward or late ears, the weak production of fickly plants, or feeds not perfectly found, as experience, he fays, has evinced, as well as that these ears are hardly found to part with their grain at any time, in whatever manner they are threshed; for though the grains be torn off from them by the action of the flail, the inmost husk still adheres to the corn. He observes also, that these diminutive, imperfect grains are fo detrimental to the corn, that they leffen its value unless they are most carefully separated by winnowing, after which they ferve to feed poultry. " If the ears (fays he) escape the flail, the straw is so much the better; our cattle reap therefrom a benefit which we ought not, I think, to grudge; because it turns to our advantage."

It is alledged, that though it be allowed that the threshed grass, and other wild productions, do yield a considerable quantity of bad or useless

feeds.

feeds, for the beating out of which the thresher must be paid; yet the grass which occasions this expence, saves a great deal of sainfoin and lucerne, which the cattle would consume; therefore, it would be unjust to complain of the additional charge in the winnowing, since applying those seeds to domestic purposes, such as feeding sowls, &c. will prove, at least, equally profitable to a real increase of corn.—M. de Lille concludes thus:

"A real increase of expence is what I pay the thresher beyond the common price of the country. This difference, which consists in two-pence or three-pence for a quarter of wheat, is but a just compensation for his extraordinary trouble in unbinding and binding up again perhaps upwards of an hundred and fifty sheaves for what an hundred sheaves generally yield, when reaped in the common way. But this expence is fo amply repaid by the extraordinary quantity of straw obtained by my method, that I rate the difference at more than the value of five quarters of corn; which, to filence contradiction, I will even suppose to be otherwise lost in my practice: still my crop is cut down and housed with far less toil and expence than if it were reaped.

"I refume my answer and say, That even supposing the expences of my harvest to be equal to what it was before, including the increased charges in the barn, and the loss of sive quarters of wheat, still my greater quantity of straw saves me several thousand weight of fodder, and produces plenty of dung, of which I daily experience the good effects."—

It is generally deemed proper to cut down wheat which is full of weeds, three or four days fooner than the usual period, that the latter may have time to wither before the corn grows too ripe; lest if it be not cut till all the grains are full ripe,

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it may be liable to damage by shedding, loss of colour, and injuries by rain. A shower, indeed, or a day's gentle rain, whilst it lies in swarth, is looked upon as being rather beneficial to the grain, by making it thresh the better; but care should be taken to prevent its being too much wetted. When it so happens that it is impossible to lay it up thoroughly dry, though it may not take much harm in the mow; yet, when laid in a heap after being threshed, it will sweat and look white with mouldiness. Such corn will not keep, and therefore should be sent to market and sold as soon as it is threshed.

In some counties of England they bind up their wheat in sheaves, though it be full of weeds, and set three sheaves somewhat sloping, against three others, after which they cover their tops with two sheaves opened at their ear-ends, which are extended and placed downward. In this situation they let their wheat stand three weeks, or a month in the field before they carry it in; as it is not found either that wet hurts it, or that it is apt to grow in the sheaf when thus sheltered; which circumstance confirms what M. de Lisle has advanced.

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In Wiltshire, in their wheat pooks, the sheaves are set in a circle, with their ears uppermost, and another circle of sheaves is placed upon that, and so on, contracting each circle, till the pole ends in a point, upon which a sheaf open, and joined with the ears downwards, is placed like the shackle of a hive; as it appears, that an ear turned downward will not grow though ever so much wet should fall upon it, and the bottom of a sheaf being broader than its top, every upper one shelves over the under like the eaves of a house. A load, or two loads, may be thus put into a pook, which is reckoned a very good way to secure corn against rain, and to give the weeds among it time to dry;

however, there is an objection to the use of this method when wheat is intended to be put up in a rick, as, if the weather proves wet, the mice will be apt to run to it for shelter, and will be carried in with the pooks.

Corn, in general, may be bettered by lying a while in swarth, or grips, to take the dews, yet its straw becomes the worse for fodder, unless it was cut before it had attained full maturity, and lies out no longer than till it has attained a suffi-

cient degree of ripenels.

But in summers which are hot and dry, when the corn fully ripens, and its own vigour gives it a proper colour, and plumps up the grain, wheat then need not to lie out in grip before it is sheaved, nor in sheaf, unless it be very full of grass and weeds; but in cold summers the grains are thin, and require being plumped, and their husks cling so close that they must be mellowed, in order to make them thresh well.—The full grain that swells the chaff even till it open in fruitful years lies almost bare to every moisture; then the heavy ears spread, and hang over the sheaf, which opening wider, lets the rains into the bands sooner than in worse seasons, when the wheat being light, the ears in the shock stand closer and more upright.

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The more expedition is necessary in reaping in proportion as the weather is hotter, for corn when hastily ripened and full in grain, soon takes a stain, sheds at every blast, and is damaged by the wet. In this case, the greater number of reapers should be employed. More cannot be desired by the farmer, than that his grain should be perfectly ripe, and of a good colour; the less, therefore, it lies abroad in grip or sheaf, the better. The cutting it light up, so as to avoid intermixed grass, &c. as much as possible, is recommended to those who wish to have it as soon as possible fit for carting; though,

though, as the reader will perceive, people who make agriculture their study differ in these particulars.

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ing; ugh, It is generally adviseable to turn the grips of wheat that are left out, very early after their being cut down, in order to get them dry as soon as possible, which is done to keep them from sprouting in the ear in case of rain. If dripping weather and driving mists should succeed after they have already been loaded with wet, and continue long, it will not be possible to prevent their growing; even the bare weight of ears has been known to sink the grips of wheat to the ground, though they have lain quite hollow. Certainly, M. de Lille's method of guarding against this is one of the best that can be taken.

The farmers in some counties where the land is rich, deep, lies slat, and is much inclosed, leave a very high wheat stubble, upon which the grips are supported, and are laid low from the ground to be dried the easier by the sun and wind; because it is concluded, that the richer and fatter the soil is, the sooner the grips will grow after having taken wet, if they lie upon the naked ground, much sooner than in a hilly country where the land is poor. Husbandmen there, besides esteeming it an advantage that they can stow a greater number of short-cut sheaves in their barns, think the loss of the straw compensated by the excellent thatch which they alledge they make of the stubble.

The warmer the season is, and the more forward the harvest, on these principles the corn may the more safely lie in the fields, either in grips or sheaves, this exposure to the air meliorating it. Thus when the wheat harvest takes place by the end of July, which has been the case, the danger in letting the wheat lie abroad for five or six days can be little or none; provided it be not over-ripe when it is cut;

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the sun at that time of the year being so hot, the days so long, the grass so short, and the dews generally so little, that the corn soon dries then after a hard shower; whereas, at the latter end of August, when the rainy season frequently begins, the dewy nights grow so long, the grass so rough, and the sun's drying power is so much abated, that the corn will be much more apt to grow if at such a season it is wetted.

Mr. Lifle recommends, in hilly countries not to bind the grips of wheat up into sheaves too early in the day, left, in fuch a fituation, they should take fo much damp by having lain on the ground, that though the straw and the chaffy ears should feem to be dry when the dew is first gone off, yet an inward dampness may remain in the corn and within the straw, which will, in such case, come damp from the rick, or barn, at threshing time. The afternoon is, therefore, to be chosen for gripping and binding into sheaves in such counties, contriving it so that this work may be finished before the day is elapsed. But the bands are directed to be laid in the morning, to prevent their cracking, as the straw will not twist after the fun is up, but will be brittle and break off below the ears. The turning of three or four of the stubble, or bottom ends of the straw, to the ends of the band, is recommended as a help to its strength and toughness.—The bands for binding up the sheaves are not to be spread but in fair weather, because being pressed down by the weight of the grip or two which it is necessary to lay upon them, to keep them in their places, and prevent them from being untwifted by the fun, they will grow fooner than any other corn, if rain should come, for they cannot dry on account of their lying undermost. But though the bands ought to be made while the morning dew is upon them, the sheaves should

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not be bound up wet, lest their growing mouldy should prove the consequence of such a procedure.

Small sheaves, in a wet harvest, are looked upon as best, because being thin at the top, and falling close, the rain is not likely to sink down into the middle of them, and to go through the bands, as it so often does in great sheaves, which lie broader and take in a greater compass. Small sheaves are likewise best, when many weeds are mixed with the corn, because the wind and sun have then greater power to dry them than when the sheaves are longer.—It is added, that reapers should take care in placing their grips, to lay the straw end in the furrow, and the ears out, that these may then stand sloping up, and lie tolerably dry, even though rain should come; while in the other way they would be likely to grow.

Wheat is found to grow better when stacked in the ear unthreshed, than its grain does alone when threshed out and laid up in granaries; besides which, a farther advantage that attends the stacking of this corn is, that the husbandman needs not to thresh it but as his markets and occasions require; whereas, if it were to remain long in the barn, he would not be able to preserve it from rats and other vermin, which harbour about the

buildings where it is deposited.

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To prevent these from destroying it in the stack, as well as to guard against the dampness of the ground, which might otherwise occasion great loss to the farmer: four, six, or a greater number of posts should be driven into the ground, according to the size of the intended stack. Beams of a proper strength should be made across them, and a shoor laid on that, for the support of the corn. Some even build these platforms so high from the ground, as to allow room for sheltering their carts and

and other implements of husbandry under them; and some erect sides and roofs to them; but this there is no occasion for, if the corn be stacked as it ought to be, with the ears turned inward, and the straw ends outward, at the same time that the top is thatched with good wheat-straw. Tin has been fometimes used to cover the supporting post, to prevent rats and mice from getting up them; but as the tin is apt to rust, it thereby loses its smoothness, and this precaution becomes of no use. Mr. Mortimer rather advises to cover these posts with Dutch tiles, which will always be found to retain their smoothness. Others make their supporters of two hewn stones, one of which being about three feet high, and floped from the bottom, where it is two feet, to the top where it is but a foot thick, standing upright, is covered with a large flat stone, either about a yard square, or proportionably, of a round form. This not only prevents the rats and mice from climbing up, but is likewife a good fecurity against dampness.—The last method, which appears to be the best of them all, is to lay a brick foundation as wide as the stack is intended to be, and to build a brick wall round it about two feet high, capped with hewn stones, which project outward fufficiently to prevent the ascent of any vermin. Or should any rats or mice, by any thing being fet against the stack, chance to climb up, they will foon be forced away ;--as they cannot live without water, if any happen to remain, they will foon die there.

In the stacking of wheat, care should be taken to lay the ear ends of the sheaves inward, and also upon a rise, so as to keep the middle of the stack full whilst it is worked up; for, in this case, when it settles, the sinking will be chiefly on the outside, which will thereby be made to lie closer; and the straw-ends being outward, and inclining down-

ward.

OI

ward, the birds cannot get at the grain, nor can rain be driven up to the ears. The shortest and thinnest sheaves should be used in topping the stack, because it cannot be so conveniently drawn in and narrowed with long sheaves.—They should be taken off the same ground, if the husbandman wants to keep any particular fort of corn unmixed. In cases where less nicety is observed, oats, or some other coarse kind of grain, are frequently placed on the tops of the stack of wheat, under the thatch, in order for its better preservation from the weather.

When room can be found in the barn, Mr. Liste does not approve of stacking any other corn than wheat. He says, he thatched a long rick of vetches brought up sharp with barley straw, to the thickness of three seet; yet he found upon cutting it, that the rain had penetrated through this thick covering, and done considerable damage to the barley. He imputes this, first, to barley straw being more woolly and spungy than wheat straw, which is close and hard; and, secondly, to the stacks having sweated and heated pretty much, in which case the covering of straw is always hollowed and softened, and consequently the wet is more apt to be retained.

As to oats, their stalks are so smooth and slippery, that they are apt to slide in the stack, which then sometimes tumbles down, if this corn was very dry when carried in. An oat rick should, therefore, never by any means be widened beyond its foundations; but barley may be placed more

upright.

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After having given an account of the various opinions and practice of different persons, together with some observations interspersed with regard to the methods they have adopted, I shall now proceed.

ceed to the recital of several experiments, such as have been made by the ingenious Mr. Young (whom I have had occasion to quote before) upon his own estate, and such as have come within my own knowledge, which will, in general, prove their own comment, and cannot but be useful to the practical farmer, if he examines and compares them with a due degree of attention.

"EXPERIMENT I.

The culture, expences, and produce of a field of fix acres, in a poor state of culture.

In 1759, this field was fallow. In 1760, it was wheat. In 1761, oats. In 1762, fallow. In 1763, it was entered on, when the expence, produce, &c. were as follow:

EXPENCES.

	1. Ty . Car (4.7)			EL LI	DAGE		1111
Labour, ple	owing i	five clean	earth	s and	1.	5.	di
one half	earth, a	at 5s. 6d.	per a	cre	1	13	0
Ditto harro	wing		14	1	0	3	0
Manuring	-	- 194	10 P.	146	I	17	0
Fourteen bu	fhels o	f feed		STATES		9	0
Reaping		4-12-39	1.100	Dall :	0	16	6
Threshing			1000	inimo La la l	3	1	7
					10	0	1
Rent, tithe,	and to	wn char	ges		5	2	0
		/ W. C.	·///		15	2	1
	P	ROD	UCI	E.			
Received for	19 qu	arters, 2	bush	els	20	7	41
Expences		Lydreau	etto de a se a	itla q arter	15	2	1
Profit, at 17	s $6\frac{1}{2}d$.	per acre		els	5 D	5	31

ค่ะ ส่วนรั คระกรกกรอดูงระ เล่า	1.	s. d.
Plowing at 1st 6d =-		9 6
Harrowing at 3d	0	4-6
Manuring occorsystem -	2	4 0
Carting at harvest 41d. p. acre	0	2 41
or litely admid a Amer Line	-	

Profit per acre, 10d. 0 4 11

Total expence per acre, 31. 7s. 01

The amounts of this crop were three quarters, two bushels per acre; but the weather proved so unfavourable as to damage it very much."

"EXPERIMENT II.

Culture, expence, and produce of a fecond field of nine acres in 1764.

The field had been clover in 1763. Not fowed till the twenty-fourth of October.

EXPENCES.	1.	S.	d.
For 2 quarters of feed		8	
Lime and falt for steep -		3	2
One clean earth	0		0
Harrowing	0	3	4
Water furrowing	0	4	6
Reaping and harvesting	I	7	6
Threshing 17 quarters	2	12	2
and with the garden with the the	9	7	8
Rent, &c.		13	0
ri ncoloru develakordisk proportisi d	17	0	8
PRODUCE.			
For 6 quarters, 6 bushels, at 395	13	3	3
For 2 bushels of offal wheat -	0	8	0
For 9½ quarters at 41s.	19	9	6
For 4 bushels	1	0	0

Carried over 34

Brought over Expences -		la C	7. 34 17	s. 0	
Profit 11. 18s. 4d. per acre	Ž.	<u> </u>	17 d.	0	ı
The state of the s	0	13			
Carting in harvest, at $3\frac{3}{4}d$.	0	2	9 ³ / ₄		
t in brune, and with the rined off			1	3	04
Clear profit il. 15s. 2d. per a	cre		15	17	0

Total expence per acre, 21. os. 43/4d.

The produce here not amounting to two quarters per acre, must be considered as a poor one. In some places the thistles were cut, which from neglect had been permitted to grow together with other weeds; but the corn was so much damaged by those who were employed to do it, that it was obliged to be forborne. In many places these were so thick, that at harvest many of them were obliged to be bound up with the corn, which was, on that account, longer in drying, and got damaged by the rain."

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"EXPERIMENT III.

Culture, expences, and product of one acre of a third field. 1764.

It had been winter fallowed by three plowings, from Michaelmas to May, and between that time and fowing, had received a fummer fallow of feveral plowings, besides harrowing. In the beginning of June, ten cart-loads of coal ashes, mortar, rubbish, &c. mixed together, were spread upon it, it being designed for turnips; but, through curiosity,

curiofity, was referved for wheat, in order to difcover the effects of the union of complete tillage and manure, attention being given to mix the compost well with the soil, by repeated plowings and harrowings. In the first week, in September, sixty bushels of soot were strewn over it, and forty of malt-dust. These were used in preference to dung, to prevent the seeds of weeds from being carried into the land. In the middle of the same month, it was sown with two bushels of red wheat from Cambridgeshire, steeped in brine, and washed well, the light grains skimmed off and then limed and salted.

By Christmas it was quite thick and matted over the land, it had come up with such luxuriance. Sheep were then turned into it to thin it; but a quantity of weeds appearing in the April following it was hand-hoed, three men being employed in the business, who were ordered to cut up freely, and not to regard cutting up the wheat, which they had directions to thin every where. After this nothing more was seen of weeds. The corn escaped laying, and was pretty lucky in harvest.—Threshed soon after;—the produce four quarters and a half.

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EXPENCES.

ni Sody po u vi za za in	7.	s.	d.	
Eleven clean earths	0	II	0	
Five harrowings	0	2	3	
Cost of the first manure and labour -	· I	13	0	
Ditto of the ferond	I	19	: 4	
Two bushels of wheat	0	11	0	
Sowing	0	0	6	
Lime and falt	0	I	1	
Herdling	0	1	0	
Hand-hoeing	0	13	0	

7 20	1			
the second and the		Į.	5.	. d.
Brought over	New York	5	12	2
Reaping and harvesting	And the second	0	7	6
Threshing	Service Service	0	12	6
Rent, &c.	mala all	31 W 1	14	0
Averal bas it seve to well in the selection of the select	sdir zai	8	6	2
PRODU	CE.	Maria.	44.4.1	lpin.
Four quarters and a half	Lands of	10	2	6
Expences		8	6	2
Profit	Se alla	The state of	16	2101
Sin determ for I his extern a	1. s.	d.		A STATE OF THE PARTY OF THE PAR
Plowing = -	0 16	6		Privi
Harrowing	O I	3	TY I -	art
Carting on the road for the	and tray	harron	1	SAL SALS
two manurings	2 2	83		Jaka .
Ditto, at home -	0 2	I	1	der and
Ditto, in harvest	0 0	33		3.0
office and gross this of	PHO (NO)	and a	LEUM	-01
The above profit	aksonaus Diens Akt	3 I	16	4
Lofs = 2 degoing and =	. All tagin o milin	. 1	6	61
			43 325	

The season being very unfavourable when this crop was obtained, and its exceeding those in the neighbourhood, will argue much in favour of complete husbandry; especially when it is considered, that the land was thereby left in good heart, which, in the end, will give such proceeding a great superiority."

"EXPERIMENT IV.

Culture, expences, and product of an acre in the fame field, 1765.

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With the same view as in the last experiment, this acre was prepared for wheat. At Michaelmas, 1763, the culture began, and the land was plowed at that time twice. In the first week of October, twelve loads of horse, hog, and cow dung, mixed together, were fpread upon it, and turned in, with a defign of keeping it warm and mellow in the winter, that it might be stirred the easier in the spring, and the weeds grow the more plentifully.—In the middle of March it was plowed.—Again towards the end of the month. Before the middle of April it had another flirring, and a harrowing. By the middle of May, the weeds had vegetated in fuch a manner, that the land was almost covered with them. Soon after the plough was fent in, and gave it the eighth earth, harrowing for the third time. In a fortnight the weeds rose again, but in smaller numbers; fome docks, however, being amongst them, they were dug up with a spade. In the middle of June a small compost of rotten hogs dung, good mould, and mortar rubbish, in equal quantities, were spread over it, to the amount of twenty cart loads, and plowed in directly. The tenth plowing was given in the beginning of August; at the end of the fame month another. In the beginning of September it received the next; after which, fifty bushels of foot, and the same quantity of maltdust were spread on it, and with the seed plowed in by the twenty-third. The feed was brought from a strong clayey foil, being brined, &c. as before. Its luxuriance was greater than that of the year before. By the end of April it was fed off with sheep twice. In the beginning of May it was hand-hoed, though there were no weeds, in spoul for Asympton one order to thin it.

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EXPENCES.

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Thirteen clear ea Three harrowing	rths	100 Y		tij es Guit Tadi	l. s. 0 13	13000
Cost and labour of two bushels of the	of thr				3 13	THE PARTY IN
Sowing - Hurdling - Hand-hoeing		Logica Sull ha		W SHI	0 0 0 1 0 12	0
Reaping and hard Threshing	resting	no ofic i ling	10 000 1 9 10 4 10 1	Wind B	o 6 o 15	3 188 LE Y K. S. S.
Rent, &c.	i s in di	5	=		6 13 1 14	6
didgis odmić oz zdylavol s od ozo	RO	DIL	CE	an d uizon	8 7	6
Six quarters and Expences	,	All Control			2 17	3
Profit E	12 5 (1)	inge se to se	l. s.	d. 0	f109	9
Plowing Harrowing	dosa a ,/ 10 a	adT guA.	0 13	9	ved!'in d- od	roig i at
Road carting for the Ditto, at home Ditto, in harvest	e man	urings	0 3	9 61	an o red tata	ena. Non
i politikus (j.) Nggoru zemo umi Bulik Johan en			n kad Hatifi Min k	77 9 1	18	7:
o This hall had a	vas gr	rice r dryd	 	2 2	11	13/4

The expences here were great, but the return was great also: fifty shillings per acre, and the land left in excellent order, must be allowed to be great advantages. Such crops as these, however, are

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are fometimes liable to be laid with heavy rains before harvest. In dry years they are exempt from this almost only danger; and the result might be sufficient to determine people to adopt this spirited business; but at the same time it is easy to be observed, that both the plowing and carting would save very numerous teams upon small farms, and much wealth in the farmer's pocket. But by continuing these experiments, the advantages of such husbandry will best be understood by the farmer."

"EXPERIMENT VI.

Culture and expences of half an acre of a third field, 1765.

This piece of land was begun to be plowed early in the autumn of 1763; ten loads of horse dung were fpread upon it, and turned in by the first earth; after this it was water-furrowed very completely, to lie dry all the winter. In March fucceeding, it received the first spring plowing, and was stirred for the third time before the end of that month, and then well harrowed. plowed three times more in April, and then harrowed twice. Numbers of weeds were turned by the seventh plowing in the beginning of May. The first week of June it was again stirred, and harrowed for the fourth time; after which ten loads of compost, hog-dung, earth, and mortar, were fpread upon it. Four plowings more were given it by the end of August. In the middle of September, twenty-five bushels of malt-dust, and as much foot, were spread upon it, the land fown, and the feed and manure plowed in by the thirteenth earth. At the end of January it was exceffively rank and luxuriant, fed off with sheep bare, and again in April; and as foon as it sprouted again, it was well hand-hoed and thinned. It was

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reaped the last week in	August,	all	upright,	and
harvested without rain.				

The product, three quarters and five bufhels"

EXPENC	ES. 1. s. d.
Thirteen clear earths	0 6 6
Four harrowings	- 0 0 9
Coft of the mortar, &c. &c.	
on the whole of the manus	
One bushel of wheat, not brin	
Sowing that the book of the	- 003
Herdling -	- 010
Hand-hoeing - 2	0 6 8
Reaping and harvesting	- 0 7 0
Threshing -	= 090
	91 3 5 3 3 3 3 3 3 3 3
Free and the control form to	3 15 4
Rent, &c.	E 0 17 0
	Mary of the state
NEW PROPERTY OF A STANDARD	4 12 4
PRODUC	
Three quarters and five bushe	ls - 7 8 7:
Zeron bevolunt 184 a. T	Here Decil And The
Expences	E 4 12 4
	Call St. St. Walls World
Profit 51. 12s. 7d. per acre	2 16 31
	1. s. d.
2선 [1882] 2014 [1882] 12 12 12 12 12 13 14 15 15 15 16 17 17 17 17 17 17 17 17 17 17 17 17 17	
	District Land Control 10 c
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Road carting for the manuring of	
	0 1 10 2
Ditto, in harvest	0 9 3± 40 10 10 1
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C. The save of vary and the last us	0 19 4
Clear profit, 3l. 12 s. 41d. per	acre 1 16 $10\frac{3}{4}$
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Seven quarters and two bushels, and with no other management than common, or methods in per-

perfection, is a very great crop from one acre of land. This certainly must be charged to the ex-

cellence of manuring.

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in rThese two last experiments, being similar in respect of manure and tillage, horse-hoeing, &c. it is proper to remark, that the one is what is called a Woodcock Loam, the other a gravelly one. In these trials,

o (a sales e	127/19		s.	
The clay loam yielded of profit	•	3	13	94
The gravelly -		2	11	11
ON ENCENTRAL STREET, S		-		
A STATE OF THE STA		I	2	73

"EXPERIMENT VII.

Culture, expences, and produce of fix acres of a fourth field. 1765.

In the years 1763 and 1764, this field yielded barley. Between the fixth and twentieth of October 1764, a compost dunghill, to the amount of ninety loads of forty bushels each, consisting of horse and hog-dung, cleansing of the yards, and eighteen waggon loads of coal ashes, old mortar, &c. &c. were spread on the barley stubble, and plowed in, half the seed being in surrow, and half harrowed in. Part of the seed was raised in the next field, and part from a neighbouring farm, both very clear of weeds.

EXPENCES.

	1.	s.	d.
	0	6	0
Harrowing	0	1	6
Cost of labour on the manure	10	4	101
Water-furrowing	0	1	4
Sowing of no solum with toward and as	0	3	0
	3	16,	6
3m M	14	13	2:

Could off a short	is the second se
Brought over	- was the substant of the start
Picking the feed	in the flows a boyog 2dio
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Weeding -	XAMERICA STRANKS
	f liquor, for the har-nounville
	or dubblithe to 0 12 0
Harvesting	8 114 Levi . 10 17 55 . Was in
Threshing eleven qu	larters minnoni 2 2 do
	in rains when woller tower.
	17 8 44
Rent, &c.	On Sie Zuch of Noventher, vi
that this balk to	sherr up. The twenty-feeding
Account to him this	at adl sond bro22 10ba 41.
and an arministration of	was half plowed, and ployed
PR	ODUCE. boweld that swe
Received for 10 qua	rters, at 41s. 500 20 1000
One ditto fcreenings	for poultry out H and 4 boot
Elizabeth States no ba	wild van griwollol all bas tell
Lated wheat lead a	Evoro Kicitzrch, toware it we
Expences	me all ment i leziona illeiem
leafon during this	le reft of native growth. The
Lofs a that your	For prerding dra W. eeed
an the twenty-fixen	ginning of bines Respect it
Plowing	August; brought ion the to-
	n the end of Och or. Food
Manuring -	- o idlidud navilbas
Manuring - Carting in harvest	9 3 3
	I all esticate to the care of the second
	lott clear earths
Total loss 10s. $6\frac{1}{2}d$.	per acre. $=$ 0111b 11ad 041
	Sy bulbels of feed
Total expence per ac	cre 41. 25. 10 d. enginerial out
This mhass was fo	SOURCE TO THE RESERVE THE PROPERTY OF THE PARTY OF THE PA
	wn after barley, on account of
recuring tome whear	straw against the winter, rely-
	ing

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bright teep plot that five for the fall beg of A it a and

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ing in a great measure on the dunghill. An ensuring dry summer reduced the manure to nothing, so that this proved a most unsuccessful experiment."

"EXPERIMENT VIII.

Cultivation, expences, and produce, of three acres of a fifth field, 1766.

This field, in 1752, was cropped with clover, which was continued in 1760. In 1761, whieat; in 1762, fallow; 1763, oats; 1764, clover; 1765, fallow.

On the tenth of November, the clover land was broken up. The twenty-second of May, it was plowed a fecond time. The seventeenth of June, it was half plowed, and plowed again the seventeenth of July. The twentieth of August, half plowed it a second time. September third, harrowed it fine. Harrowed it again on the 19th, and on that and the following day plowed on to the ridge, five to the perch, fowing it with red wheat feed, four bushels of it from Isleham, in Cambridgeshire, the rest of native growth. The season during this fallow exceeding dry. Weeded it by hand in the beginning of June. Reaped it on the twenty-fixth of August; brought it in the twenty-eighth, threshed it at the end of October. Produce four quarters and feven bushels.

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EXPENCES.

hearthe field was to well wasseld everal	1.	s.	d.
Four clear earths	2	8	0
Two half ditto	0	3	0
Sowing -	0	2	.0
Six bushels of feed	1	II.	0
Two harrowings	0	2	0
Water furrowing	0	4	6
Deepening the furrows in the winter	0	I	0
M 2	4	11	6

ighte and distilled the day hill. At enfigi
Brought over studies and the state 4011166
Weeding by hand with the site of owo 46
Reaping 0 12 9
Harvefting 11-Mal A Malayska o 2 o
Harvestmens allowance
Harvesting 4 quarters 7 bushels of wheat 0 13 6
The mail ble inputation was everyond with shovers
Two years rent, &c. 5 2 0
given. On the eleventh, it was har await. Or the
6 Affect Rend of November she she on inter wes
Topicon the contract the second of the prince of the second of the secon
Four quarters, 7 bush. of wheat, at 46s. 11 4 6
Lofs, 3s. 4d. per acre
the water of graying day slowed on to an idea,
Plowing III I I I I I I I I I I I I I I I I I
图 19. \$P\$ \$P\$ (19.10) (19.10) (19.10) (19.10) (19.10) (19.10) (19.10) (19.10) (19.10) (19.10) (19.10) (19.10)
Carting in harvest - 0 2 3
THE A COMMITTER STREET, Wheeled in Soyl Land the Gle
marilem to samuel frame Academic to the first
Less and the contract of the c
Lofs, 16s. 9 d. per acre
This was but a poor crop upon fummer fallowed

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This was but a poor crop upon summer fallowed land, and when the field was so well water-furrowed and weeded. But the months of May and June (the former especially) had proved very wet. The water furrows being very deep, however were extremely serviceable, else the crop would probably have been killed; yet after all this the wet season greatly injured the corn. The Cambridgeshire grain, in this experiment, far surpassed the native

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wed wed fune The exably afon hire feed feed from the sprouting till Christmas; afterwards there was no apparent difference."

"EXPERIMENT IX.

Cultivation, expences, and produce of one acre of the third field. -1766.

It had been plowed for the first time in September, 1764, when fixteen cart loads of horse-dung were turned in. In March, the fecond earth was given. On the eleventh, it was harrowed. On the eighteenth, it was plowed again; and on the twenty-fourth, the fourth earth was given. In the beginning of April it received another, and was well harrowed. It then lay till the middle of May, when the weeds being fprung up pretty thick, they were turned down by the fixth plowing. In the beginning of June, twelve loads of compost, rotten farm-yard dung, mixed with mould and turned several times, were spread on it, and the next day plowed in. In the middle of July, the eighth plowing was given, and the ninth in the beginning To complete the work, in the last of August. week of September, forty bushels of malt-dust were spread on it, and plowed in with the feed .-The last came from Cambridgeshire. Produce, five quarters and eleven bushels.

EXPENCES.

specific out was to well water through	I.	s.	d.
Ten clean earths	0	10	0
Three harrowings	0	0	8
Labour in the first manuring -	0	4	0
Ditto in the fecond	0	8	6
Cost of the third, and expence, &c.			
Luce to come The Catilnoque	0	18	6
Two bushels of feed	O	10	6
Sowing - The	0	0	6

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Much of this manure here being in stock, and the wheat not only producing well, but selling at a greater price, made this crop particularly advantageous. As to the plowings being sewer, and the hand-hoeing omitted, it is not clear whether the crop might or might not have been still larger, if these operations had been performed as in former experiments."

"EXPERIMENT. X. ni wol

Cultivation, expenses, and produce of four acres in a fifth field. 1767.d ar game

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The clover land was plowed up in the beginning of November, 1766, and sown with one quarter of wheat; the surface was harrowed very fine, first with common harrows, and afterwards with bush ones. It broke up mellow, and in fine order.—August the twenty-seventh, repeated it; carried the second of September.—Product seven quarters, sive bushels; and six bushels of screenings: in all, eight quarters and three bushels.

EXPENCES.

AL FOREIGN	1.	5.	d.
One plowing	0	5	6
Harrowing	0	2	6
Seed	2	6	0
Sowing	- 0	1	0
Water-furrowing	0	0	9
Reaping	0	18	0
Harvefting	0	1	6
Harvestmens allowance :	- 0	4	0
Threshing		4	6
D 20 01 0	5	3	9
Rent, &c.	3	8	0
	8	11	9
PRODUCE.	in to do	Mo	
Seven quarters and 5 bushels of who Six bushels of screenings -	Olf Park	16	36
to the ployings being fewer, and the	AS AS	18	-
mitted, it is not clear whethered in might not have deen fill high	8 cing or	II V QO	9
Profit per acre, 3l. 1s. 9d.	12 d.	7	0
Plowing Plant MI H Hold 9	9	V LO LO	
Carting in harvest			
M 4	- 0	19	5

3 4 - 1 d

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Total expence per acre, 21. 7s. 91d.

A proof of the many effects of good husbandry appears in this crop. The foil of the field where the feed was fown was dry, but the not over-cropping it, and always throwing in turnips and clover between two crops of wheat, and manuring the clover upon which this wheat was fown, proved of excellent use, and even operated, in a measure, against the season itself. Also manuring on the clover after the barley is off, seems preserable to laying it on directly before the wheat is sown.

The feed for this, as well as for No. VI. and VII. was not steeped, it was only swum and dried

with ashes.

"EXPERIMENT XI

Culture, expences, and produce of eight acres of a fixth field.

August the thirteenth, 1766, the tare stubble was plowed up, which had been mown for hay. Harrowed it on the nineteenth of September; the thirtieth, plowed it slat across, and harrowed it. Between the second and twentieth of October, carried on, and spread two hundred and twenty-one loads (each forty bushels) of manure, which is twenty-seven per acre.

The twenty-fecond plowed and fowed it with two quarters of wheat. August the twenty-eighth, reaped it, and carried, September the twelfth.— Produce fourteen quarters, four bushels; and six bushels of screenings.—In all, sifteen quarters and

two bushels.

[i69] EXPENCES.

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LAILINGED.			
State of the state of the state of the	l.	s.	d.
Three plowings	. I	4	0
Twice harrowed	0	3	Ó
Two quarters of feed -	. 4	12	0
One hundred and fifty-one loads,	2	2	4
One hundred and lifty-one loads,	The Ar	6.34	
at is. 8d. Seventy loads, at 113d -	12	II	0
Seventy loads, at 1134	3		8
Sowing The South of the South	17 do 11 1 7 19	4	0
Water-furrowing -			10
Reaping no beauty or all the total			0
。2. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	0		9
Threshing	0		0
Threshing Carrying out	2	200	9
Carrying out 101 as. Z.	2019	II	
both has newly two at a paragraphic	24	4	10
Rent, &c		16	0
		. /	_
Links Karaman ten	41	1	10
PRODUCE.	9.63	HALL	
Fourteen quarters and 4 bushels, at 44s.	21	18	•
Screenings	311	15	0
and 101 amout used from training which	OWC	ig o z	DAY
Expences nearest le diagrama can do u	32	12	0
Wester the Care across and harrowed its		1	Sec.
the focusive and twentieth of October,	3 - CM.	10 VV 4	36
Loss, 11s. 1 d. per acre -	4	8	10
and we structure to the second to s. d.	(174)		11.54
Plowing 2 18 6	7174	1 3 44	
Harrowing o 6 o	*(************************************	2 5 10	116
Manuring - 3 8 10	34.		to min
Carting in harvest - 0 4 4			
Carrying out the corn one	Trans.	la r	115
journey of seven miles 0 7 1	4		The .
		i de	
EXPENCES	7	4 1	
Control and the second		TO	fs,

Loss, 11. 3s. 2 d. per acre.

Total expence, 51. 10s. 10d. per acre.

This was the fourth crop since the field was fallowed; but the last of four for hay proved as beneficial as a fallow; and though the land was so well manured, no weeds sprung up even in a wet year. The price would have been larger, had not the sheaf received damage by the wet in harvest. Fallowing it appears from hence is not so very necessary as some esteem it. It may certainly be dispensed with, in favour of a meliorating crop, where the soil is in good order, and the compost not laid on too fresh upon it, but brought from a compost hill, not out directly from the stable. A little before harvest this corn made an excellent appearance; it was hurt only in price by a most unfavourable season."

"EXPERIMENT XII.

Culture, expences, and produce of a fixth field,

This field was fown with clover in 1765, but most of the feed failed; it was, however, let to remain by way of turf to cut on, as the field was to be clayed. Accordingly, in February 1765, this work was begun, and finished in the July follow-Three hundred and eighty loads of white clay (thirty bushels to the load) were laid on this field, which was a loofe woodcock loam; this, when well harrowed, formed a fine bed of mould that covered the whole field. October the feventh, 1765, plowed it up; harrowed it on the fixteenth. Stirred it, June the second, 1766.—A third time the twenty-seventh day of the same month.- July the first, harrowed it. On the sixteenth, ribbled it close across.-August the thirtieth, plowed it on to the ridge.—Harrowed it.—October the twentyfifth, plowed and fowed it.—Reaped it, September the third, 1767.—The fourteenth, carried it.—Produce, fix quarters and one bushel, besides three bushels of screenings.—In all, six quarters and four bushels.

EXPENCES.

EXPENCES.		A A A A	11-11-11
place verile have been larger, bad nor	1.	s.	d.
Six plowings -	0	18	0
Three harrowings	0	1	6
Six bushels of feed	1	14	6
Sowing Sold - 100	0	T	6
Water-furrowing -	0	2	10
Reaping 2001 200 1200	0	13	6
Harvefting -	0	2	0
Harvest expences -	0	3	0
Threshing -	1	2	6
	4	Iģ	4
Rent, &c. for two years	5	2	0
xpences, and produce of a fixin field.	_		13
37572	10	1	4
eld was fown with clover in 1765, bet	11.	in I	
er of tel revew PRODUCE	117	o.fl	orti

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Six quarters and 1 bushel	Dain by Tay of
Three his hale of forespings	in A developed
Three bulliels of fcreenings and a said to be follow	0 14 0
. whom Amf autur Damun nur .	.work was begin
odied and eighty loads of white	ing sorter e. out
Expences SEW (201 b or E)	Bud 5 - 5 3 5
Expences	10 1 4
s a loofe woodcock loam, this	Ew dordw shield
Profit, 11. 14s. 8d. per acre	when well harro
Juneyal ada rada (NA alam alama	ide garalent mail
Commence of the Commence of th	S
Plowing out not beworth 2	3 10219 65061
Harrowing A - 320 , 20000 of	Surred JEA luge
Cilia discoverage and in with de	3 TE
the day of the favored in gritish	TE V 27 = 13 10 3 3111
ed iti—On the lixteenth, labbled	rise brit, harrow
August the thirtieth, plowed it on	-2000 3 8 mg
Computed is a Catabar the mount	2 0 102
Harrowed it October the twenty	7000,751

Profit, 18s. 43d. per acre

The above profit, confidering two years rent included in the account, is not trifling; yet it appeared, as we find, to promife more; infomuch, that five quarters per acre were expected from it. The price of it would have been greater but from the wetness of the harvest."

"EXPERIMENT XIII.

Culture, expences, and produce of a feventh field of twelve acres.

The land level by harrowing; it was plowed and fowed with wheat the twenty-ninth of October.—Reaped on the second of September.—Carried the fourteenth.—Produce, ten quarters, five bushels; and six bushels of screenings.—In all, thirteen quarters and three bushels.

EXPENCES.	7.7.	S.	d.
One plowing -	0	12	0
Three quarters of feed	7	0	0
Sowing	0	6	0
Water-furrowing	0	6	O
Lime and falt for steep	0	5	0
Reaping	2	14	0
Harvefting -	0	7	0
Harvest expences	0	12	0
Threshing - did	ad 2	13	9
Rent, &c. hower box howe	14	15 4	9
PRODUCE.	24	19	9
Ten quarters and five bushels Screenings	23	0 12	3
total suff scoreup on Falled in bo	E EDT	12	OX
Expences 2 2 2	25	12	3
Emperices 2 2 2	-4	-9	9

Profit, 1s. per acre	
Plowing of guillers com- mi to 9 1	
Carting in harvest - o r	
The state of the second of the state of the	1 10 10
The above profit	0 12 6
Lofs, per acre	0 18 41
Total expence per acre, 2l. 4s. 2 d.	

The foil here being wet, and the feafon unfavourable, no very good crop could be expected."

EXPERIMENT XIV.

Culture, expences, and produce of nine acres of a feventh field. 1767.

Three acres and an half of it were cropped with beans in 1766, one acre of potatoes, and the rest fallow.—March the seventh, 1766, plowed the fallow four acres and half.—June the second, stirred it again.—July the twenty-second, the third plowing.—August the second, harrowed it.—September the first, plowed it on to the ridge.—October the twenty-ninth, plowed and sowed it.

Plowed up the bean and potatoe acres, October the eleventh.—Harrowed them with a two-horse large roller, November the fourth.—Plowed them again on the fifth.—Harrowed the seventh; and the eleventh, plowed and sowed. These acres were

thistled in the month of June.

Reaped the whole, September the twenty-second.—Carried the twenty-fifth.—Product of the whole field, ten quarters, one bushel; and two quarters, one bushel, of screenings.—In all, twelve quarters, two bushels; of which nine quarters (eight of the best and one of screenings) were from the fallow four acres and an half.—Two quarters, five bushels

(one quarter, five bushels, of the best, and one quarter of screenings) from the bean land, and five bushels (four of the best and one of screenings) from the potatoe acre.

EXPENCES. Date source Se
halk the try by bandry in- the master mene, of
Plowing and a service supplied on on the 16 00
Harrowing and rolling - 0 3 0
Eighteen bushels of seed - 4 17 0
Sowing South State of State of oc. 4et 6
Water-furrowing - 0 12 9
Thiftling four acres and half - 100 8797 6
Reaping was a story of a story of a story
Harvest expences of a second second of gold on the Harvest expences
Harvelt expences
Threshing to the under the art and respond region,
Carrying, &c. well and to the the control of the
and become a south of the same and this glad
Rent, &cc. / Sec. / Eumait held dineard you 6
First Than the improved himosury is too ly
monte coperate than the common
Secondly That it produces in quantity three
times more than the OHIORY
Ten quarters and I bushel 22 0 9 Two ditto, and I ditto screenings 1 1 1 1 1 6
Two ditto and I ditto forcenings
1 wo ditto; and 1 ditto icreenings
unprohibition the commons are the surface.
Loss, 2s. $6\frac{3}{4}d$. per acre
The state of the s
the contanguler encountered is, the flare of the stand after the two includes a land one arrays ward.
Plowing salpher in sold on the 7 bow to the boat
Plowing Harrowing Rolling Carting in harvest Carrying O
Rolling
Carting in harvest 0 4 9 100 W
Carrying 1 2k , bougen wen en of 20 37 0202 5123
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1. s. d. Total lofs, 14s. 7d. per acre - 6 19 7

Total expence per acre, 3l. 8s. 7d.

Upon comparison of the fallow, the bean, and the potatoe lands in this experiment, it appeared, that the new husbandry in the management of beans, was by no means equal to a fallow in preparing the land for wheat.

The profit of the beans was per acre - 1 18 10 The lofs by the wheat (to be deducted) 0 18 0

The remainder

This is the profit of two years, which proves near five shillings superior to the profit by the fallow wheat in those two years; so the fallow is the better preparer; but the greater profit arises from the two crops, and a loss of near five shillings per acre, in not having sowed the fallow part of the field with beans in 1766.

It may be concluded from these experiments, First, That the improved husbandry is doubly more expensive than the common.

Secondly, That it produces in quantity three

times more than the common.

Thirdly, That the profit attending it is feven times greater than the common.

Fourthly, That bad years alone taken, it is more

unprofitable than the common.

The most important of these points is the superiority of prosit; and one mode being seven times over better than another, is a prodigious superiority; but another circumstance is, the state of the land after the two methods. In one it is exhausted, and sult of weeds; in the other in vast heart and quite clean. From both these reasons, there is proof of the improved husbandry being most beneficial.

We shall subjoin here some experiments upon wheat, according to the new method, as tried by

the same persons with the same degree of exactness, with which we shall conclude this chapter."

"EXPERIMENT I.

Culture, expences, and produce of half an acre of a field, the foil a woodcock loam.

This piece was plowed once in the autumn of 1764, and once more by Lady-day, 1763; from that time to September, it received three more plowings, the last of which struck it into steatches, or beds, five feet wide. In the middle of that month, these were arched up by what is called upsetting; that is, the plough begins at the top of the ridge, and finishes on both sides in the old surrows. It was then harrowed fine, and drilled with wheat in three rows at the top of each ridge, eight inches as under; the drills were struck by lines with hoes, the seed sowed by hand, and covered with rakes; it took three pecks in quantity.

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Afterwards the wheat was fown deep, and fufficient water-furrows were cut through it, to lay it

dry for the winter. Jones and and sellegue som

In the middle of March, the rows were handhoed with hoes four inches and an half wide, and the outfides of the outward rows also hoed for a The last week in the same month, the few inches. first horse-hoeing was given with a common plough, by a bout turning a furrow from the wheat, and throwing a ridge up in the middle of the interval; but from this operation, the spaces left of three feet eight inches were too narrow for a bout. Beginning at first near the wheat, the plough was found to bury it fo, that it was forced to be ordered otherwise, so as to leave a stripe of six inches broad, which diminished the furrow to two feet three inches. When it was finished, the waterfurrows were scowered out again, lest heavy rains should destroy the crop. It was horse-hoed the first

first week in May a second time, by splitting the little ridge before left in the middle of the intervals; but this, on account of the narrowness of the space, was forced to be done by three cuts of the plough. In June, the rows were again handhoed as before. The end of the same month, another horse-hoeing was given, reversing the last. The middle of July it was horse-hoed again, splitting the ridge twice in a place, to open the surrow deep. It was harvested favourably. The produce, one quarter and one bushel.

EXPENCES.

and the second ever door no self amo	1.	s.	d.		
Six plowings	0	3	. 0		
Two harrowings			6		
Drilling	0	0	13		
Seed was the same of service to a con-	0	3	41		
Water-furrowing three times -	0	5			
Two hand-hoeings		5	6		
Five horse-hoeings -	0	1	8		
Reaping -	0	2	8		
	0	1	I		
Threshings and a tree of the con-		•	10		
t the bestered town also boots (or a) but full week to she take taken boots (or the		6			
Rent, &c.	O	17	0		
but wadw odf most vortar a sie	_				
the the entire middle of the interval."	2	3	94		
PRODUCE.	491 J	2779	2 3 3 3 3		
One quarter, 1 bushel, at 425:	2	7	3		
One quarter, 1 bushel, at 425.	2	3	7+		
Profit, 7s. 3 ¹ / ₂ d. per acre	0	3	73		
respectively left bedy the service of	The land	8191	DANAP.		
or the cot. He was borde-bord the	Plowing				

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Plowing -		0 3	0 1	
Harrowing -			2 1 0001	
Drilling -	- 1 - 1 - 1 - 1		04	
Horse-hoeing	- Fin Bill		$O_{\frac{1}{2}}$	
Carting in harvest	i in ba		13 100	
- Halini scotto et Sali	a gala m	l onoi:	-	D
all Thomas and a second second			0 4	. 5
The above profit	lana vy	อย์-ทางก	0 3	74
and desirented at		Table day	oid the	-
Loss, 1s. 7 ¹ / ₂ d. per	acre	e analy	- 0 0	91

This, as a first trial of drilling, succeeded better than could be expected from the appearance of the corn all the year, which was unfavourable. It was, however, free from all weeds, and the horse-hoeings which were given with two horses, were numerous enough to preserve the ground in good tilth."

"EXPERIMENT II.

Culture, expences, and produce of half an acre of the fame field. 1764.

This piece was plowed in the autumn of 1762; twice more in April: the last earth threw it into steatches five feet broad. It was then arched up, harrowed fine, and drilled by hand, two rows at one foot asunder, at the top of each bed, taking three pecks of seed. After sowing, it was thoroughly water-surrowed. The last week in March, it received its first hoeing, which turned a surrow on each side from the corn, throwing up a ridge in the middle of the interval, and water surrows scowered. A fortnight after the rows were handhoed, with hoes nine inches wide, not only in the space between, but also sive or six inches on the outsides, so as to leave the rows on a stripe of well cut and loosened earth. In the middle of May it

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was horse-hoed again, and hand-hoed a fortnight after, the hand hoes hand-weeding the rows as they went along. The last horse-hoeing reversed the work of the first; and the third, which was given the first week in July, did the same by the second. The fourth was performed in about a week after, leaving an open trench in the middle of the interval, and the corn, as it were, banked up. The effects of these horse-hoeings and hand-hoeings were always visible in a day or two, in deepening the green of the plants, and increasing their growth. The wheat was reaped the first week in September. Product, one quarter and four bushels.

EXPENCES.

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		1.	s.	d.
Eight plowings		0	4	O
Two harrowings		0	0	
Drilling -	. 4	0	0	13
Seed		0	3	100
Water-furrowing three times	÷ .	0	4	9
Two hand-hoeings		O	4	
Four horse-hoeings		0	1	4
Reaping		0	3	0
Harvesting		0	I	.8
Threshing		0	4	6
		-		
		1	7	113
Rent, &c.		0	17	0
		-		
		2	4	I 1 3
	A 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	-		
PRODUCE.				
One quarter and 4 bushels, at 425.		3	3	0
Expences		2		113
		_		
		0	18	01
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Plowing 0 4 0 saw wad	
Harrowing 0 0 21 215 3d	1
Drilling 0 0 0 0 4	
Horse-hoeing o o 10	
Carting in harvest - 0 0 13	

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Clear profit, 11. 5s. 7d. per acre

About twenty-five shillings per acre, from land that is left in good order for another crop (as Mr. Young observes) is to be considered as a considerable return; the fuccess encouraged him to proceed with farther experiments.

"EXPERIMENT III.

Culture, expences, and produce of half an acre in the same field. 1764.

The piece was plowed in the autumn of 1762, and was ftirred again in the following fpring. From that time till Michaelmas, it received four earths more, the latter of which threw it into fleatches of five feet; upon which eight cart loads of mortarrubbish and coal-ashes were spread; then another plowing turned in the manure, and at the same time arched up the beds. It was harrowed, and drilled in double rows, one foot, with three pecks of feed, and well water-furrowed.

It received the first horse-hoeing in the first week of April; the water-furrows were fresh opened, and the hand-hoeing given in about ten days. During the fummer it received three horse-hoeings more, and one hand hoeing. The appearance of this corn was, at first, fine and luxuriant; before harvest, however, the stalks and leaves appeared of a fpecka speckled and unwholesome cast, and though the straw was in a large quantity for drilled corn, yet the ears were very poor. It appeared to be slightly mildewed. It was reaped at the end of September. Product, seven bushels.

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EXPENCES.

EXPE	NO	CE	S.	177	+1100	0
Seven earths			^	1.		d.
One harrowing				0	3	6
Drilling -		-		0	0	2
Seed			W. TE	0	0	1 4
Water furrowing three tin	1304	9			3	4
Two hand-hoeings	ies	Danie.	rensy.	0	5	0
Four horie-hoeings	11111	1	(M 10)	0	5	6
Reaping	100	44	haby.	0	1 4	1
Harvesting -	2 40	Dali 🕶			3 10	2.1
Threshing	Sixon	BING	TX4	0	2 1	97
III TARAN				0	3 2	
page of the lander	, L		7.12	I 8	3 0	1
Rent, &c.	2015		N. T.	0 17	7 0	30.
of relie abrenian of the				2 6	19	-
and grival grivellor and				2 5	0	Ŧ
PROD	UC	E.	balle,	grain	i jest	1
Seven bushels, at 38s.	THE R	107	enshiri.	1 13	970r	
Expences 15			ingini ingkal	3	3	
Produce			E wheel	2 5	01	1
The survey of the last	den	-	1 40	1 13	3	
Loss, 11. 3s. 71d. per acre	87.33	t th	incos)	社會物質	T H	
STAN THE WAY OF THE WORLD SEE			ic fair) 11	9=	
Diagram of San	1.	s.	d.	437	TAN I	
Plowing	0	3	6		13	
Harrowing .	0	0	I		Diff	
Drilling	0	0	03	e delle	HALLE	
Horse-hoeing	0	0	10		71	
N'-	-		=			
N 3			0	4	53	

My author is apt to believe, that the reason why this crop proved so very disadvantageous, was the neglect of feeding off the green wheat in the spring (a method which though some do not approve, yet all husbandmen allow some way of thinning it should be adopted) for want of which precaution, though the crop was not beaten down, yet its luxuriance might occasion a rankness in the straw attractive of the mildew.

"EXPERIMENT IV.

Culture, expences, and product of a rood in the fame field. 1764.

Once plowed in autumn, 1762. Again in April, 1763, and five times more by the end of August. The first week in September it received its eighth plowing, which completed the design of laying it on a perfect level. It was afterwards harrowed three times, to make it very fine, and then drilled in rows equally distant, one foot asunder; taking half a bushel of seed. It was water-surrowed every way very deep, to keep it dry. In April it was thoroughly hand-hoed, and hand-weeded against the beginning of June. In September it was reaped. Produce, eleven bushels.

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EXPENC	ES.		D.Y.O	1.	5.	d.
Eight plowings		5.A. 18	7.4	0	2	0
Three harrowings -				0	0	2
Drilling	,	-		0	0	6
Seed		-		0	3	0
Water-furrowing -	1			0	2	3
Hand-hoeing -				0	6	O
Reaping -				0	1	6
Harvefting		-		0	0	8
Threshing -				0	4	6
of bear and a second of	ICA			8 0	ly!	
Sa senongerin abanda yeng at a		9:4		I	0	7
Rent, &c				0	8	0
ca soa un umor upi se a sec s es e smol volla casa l'es		110			O INC	1
blow to take tot change a	STEPH.		. 3	I	8	7
				-	1010	3
PRODU	CE	•		-1774	DOT	7
Eleven bushels, at 425.			a Kil	2	17	0
Expences -			1	ī	9	9
the state of the s					9	
Profit, 5l. 14s. 8d. per acre				1	8	8
	11				11/1	
* * * * * * * * * * * * * * * * * * *	1.	s.	d.			
Plowing	0	2	0		1	
Harrowing	0	0	1			
Drilling -	0	0	0		1	
Carting in harvest -	0	0	0	•		
		_		-		
The transfer was the second				0	2	23
in the state of th	45			_	-	4
Clear profit, 51. 5s. 9d. per					1 1 7 5	
	acre		_	1	6	cT
Clear pront, 31. 33. 94. per	acre		7	1	6	5 ×

The profit of this crop is extraordinary great; the very principle of its culture was fuch as must have produced a great crop; the hand-hoes, by having a free space to strike into, cutting much deeper than in the broad-cast hand-hoeing. But

the

the success may properly be said to depend on the water-furrows being so deep and plentiful; since the land was so exactly flat for the sake of drilling and hoeing, that the crop would otherwise have suffered by the wet."

"EXPERIMENT V.

Culture, expences, and produce of half an acre in a fecond field, light gravelly loam. 1764,

This piece was plowed for the first time in autumn, 1762. The following spring it was stirred again. The last week in June a third time, and harrowed. In September two more, the last of which threw it into beds of five feet wide; another soon after arched them up; three rows of wheat were then drilled upon the crown of each bed eight inches asunder. In April, the first 'horse-hoeing was given; at the end of the same month the rows were well hand-hoed and weeded. In May it was again both horse-hoed and hand-hoed. In June horse-hoed again, and the first week in July again for the last time. It was reaped the end of August. The product two quarters and one bushel.

EXPENCES.	7.	5.	d.
Eight plowings -	0	4	0
Two harrowings	0	0	3
Drilling	0	0	1 3
Three pecks of feed	0	4	0
Horie-hoeings four times	0	1	4
Hand-hoeing twice	0	8	0
Reaping and the west of the same of the sa	0	2	3
Harvefting	0	1	2
Threshing of small - the months - man along	0	5	8
tractic exactly unitlar, in every refued.	-		
of ad all	1	6	97
Rent, &c	0	17	0
LIVERIMENT	2	3	9 1

PRODUCE.

	ODO	C 1	•		1		d.
Two quarters and in Expences	bushel,	at 4	. 1 <i>s</i> .	•	4 2	7	0 9 ³ / ₄
Profit, 41. 6s. 41/2d.	per acre		-		2	3	2 4
arcia de con tallantes		1.	s.	d.			
Plowing -		0		Q			
Harrowing -		0		2	1		
Drilling -		0		K 13 6			
Horse-hoeing -		0	0	10			
Carting in harvest		0	0	1	3		
assemble her as the		de da		100	0	5	23/4
Clear profit, 3l. 153	. 11d. per	ac	re	CATE	1	17	1113

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This experiment, the refult of which was a confiderable profit, ferved to shew that the drill culture would succeed upon this soil as well as in a light, gravelly land; and indeed this, besides sparing the expence of water-furrowing, generally pays well for tillage. All the operations of hose and hand-hoeing, and weeding with the latter, were properly performed; the young wheat had a fine appearance, and the land was besides well prepared for future crops that might be sown upon it."

We shall next give a few experiments tried merely by way of comparing the old husbandry with the new, which were made on the same kind of soil, and the treatment exactly similar, in every respect, where it could be so.

"EXPERIMENT I.

Culture, expences, and produce of an acre of a field, two divisions, the foil a woodcock loam. 1764.

The tillage of this acre began in autumn, 1762, when it received one plowing. By May-day, 1763, it received two plowings more. It was firred twice in June, once more in July, and again in September, which left the acre level. It was then struck into two equal parts, of half an acre each, one of which was plowed in beds five feet wide, and harrowed, the other into common ridges. The last week of that month, the half acre in beds was upsetted (as they term it) and drilled with three pecks of wheat in three rows on the top of every bed, eight inches asunder, and the other half sowed with four pecks of wheat in the common manner on the same day.

As foon as the acre was fown, it was water-fur-

rowed equally by cuts made quite across it.

In the middle of March the rows were handhoed with hoes four inches and an half wide; in about a week afterwards, the first horse-hoeing was given; after which this half acre was again waterfurrowed.

It was horse-hoed a second time in the middle of May, and at the end of the same month hand-hoed again. In the middle of June it was horse-hoed a third time; and the beginning of July it was horse-hoed for the fourth and last time.

All the culture bestowed upon the other half acre, was that of cutting out some thistles in the

middle of fummer.

Account

The last week in August they were both reaped on the same day, and directly threshed.

The

The produce of the drilled was That of the broad-cast	1	b. 0	I
Superiority of the drilled 2 pecks per ac		0	1
1966 or medical action of animal about		1 4	1
Account of the broad-cast half a	cre.	304	Tr.
EXPENCES.	1.	. s.	d.
Nine plowings	0	4	6
Seed on me lind to street out or own or		4	
Sowing the Edge Eve feet variety	0	0	3
Water furrowing twice -		4	
Thiftling ores that sets Annous said to	0	v ils	0
Reaping bell-16 bas the same		2	
Harvesting	9. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.		
Threshing die von - de de de	0	2	0
the common state of the common states	-	11717	-
Rent, &c. 1 1 2 2 2 2 2 2 2 2 2 2 2	I		
really by cuts made quite across it.			
middle of March the rows were hand	TUNE	17	0
h boes four inches and an haif wide			
week, A.D. U O R. T. horfe-hoeing wa	6 71	roots	
one quarter w rast half acre w rastaup and	: ::	give	0
Expences	orvec	14	0
s horle-boed a second time in the middle	CW d	1	-
Profit, 185. per acre to bas adt to land the land the land to elbein ent 1.15. d.	0	4	0
Plowing gninning gniwolf q			
Carting in harvest - 0 0 1	ron	was	
all and of the negli bewould southin of	7-117	9	
is that of current out fome thiftle;	0	6 1	103
The above profit - inor avoid and laft week in August they were both	0	4	0
latt week in August they were both	91		
Loss, 5s. 9 ¹ d. per acre	0	2	103
	A	cco	unt

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Account of the drilled half acre.

EXPE	NCES.	1. 13. d.
Mine mlawings	THE TOURSE	TAL DELCCAL DE
One harrowing -	द्रवती (त्रीते जो)	10 70 VO 112
Seed	n a mishiri	9010 3 4 T
Drilling -	. .	0 0 11
Water-furrowing thrice	11-91-31-917	0 1 0
Three hand-hoeings	Ja Ding Japan	900 3019
Four horfe-hoeings	in "this fit or	ol T 4
Reaping	báwala zev	
Harvesting -		Ontatol
Threshing -		0 2 11
		Lines were give
		0 19 74
Rent, &c.		0 17 0
no the drawn with to	Jan Bet at	T white the
And the Contraction of the	S. A. A. B. Sala	1 16 73
PROI	UCE.	with a neede
One quarter, 1 peck, at		
Expences	one on the	2 1 74
Profit, 3s. 4d. per acre	0.7411 0.7410 7 31	0 1074
ont is some holding as	1 .	
Plowing -		
Harrowing	0 0	I hand some
Drilling		
Horse-hoeing	0 0	Ione rettel
Carting in harvest -		$1\frac{3}{4}$
Carting in marveit		on swampan
	The School	0 7 11
The above profit -		0 1 8
The above prome	Fre Orania	10
Loss, 12s. 6d. per acre		9 6 3
COMPA		
Loss by the drilled, as al	oove -	0006 3
Ditto by the broad-cast	- 11	0 12 103
S Profesional Supplementaries		
Superiority of the latter	-	0 3 44

This comparison is exact in every circumstance; the samples of the grain were sent to market, and the price is charged accordingly. Here the result is in favour of the old method, but one experiment can determine little in a matter of this nature."

"EXPERIMENT II.

Culture, expences, and produce of half an acre in the fame field, in this division. 1764.

This piece was plowed in the autumn of 1762. In spring, 1763, it was stirred three times more, and during the following summer three more plowings were given. In the middle of September it had the eighth, which threw half of it on to beds five feet wide, and half on to common ridges, a yard wide. The last week of that month, and on the same day, the first was arched up, and drilled with a peck and a half of wheat, in three rows, eight inches asunder, and the other plowed and sown in the common manner, with two pecks of the same wheat; and the piece equally water-furrowed.

The broad-cast rood was thistled once in the succeeding year, the drilled one horse-hoed sour times, hand-hoed three times, and hand-weeded once. They were both reaped on the same day, the latter end of August, and threshed.

		JISV1	q.	b.	p.	
Product of the drilled	-		0	5	0	
Ditto of the broad-cast		•	0	4	0	
		tilo	19 57	oda	1524	The second
Superiority of the former	r		0	T	0	

Account of the drilled rood.

EX	PEI	NCES.	1:	5.	d.
Nine plowings	-310	ode as abo	linb o	2	3
One harrowing	0.	ad-caft	010 06	0	OIL

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	l.	s.	d.
Brought over	0	2	4
Drilling	0	0	03
Seed	0	I	8
Water-furrowing thrice	0	2	6
Three hand-hoeings	0	4	6
One weeding -	0	0	6
Four horse-hoeings	0	STORE STATE	
Reaping	0	I	134
Harvefting -	0	1	6
Threshing	0	I	5
Same and the same of the same	_	-6	0.1
	. 0	16	81
Rent, &c.	0	8	6
DRODUCE	1	5	2 × 2
PRODUCE.	_		100
Five bushels, at 42s.	1	6	3
Expences	- I	4	81
Profit, 6s. 1d. per acre l. s. Plowing - 0 3 Harrowing - 0 0 Drilling - 0 0 Horse-hoeing - 0 0 Carting in harvest - 0 0	0 d. 41 03 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1	1	61/2
and the second s	· •	3	111
The above profit	0	,1	61
Loss, 9s. 9d. per acre	0	2	5
Account of the broad-cast r	ood.		
EXPENCES.			
Nine plowings	0		1
Seed	0	2	7=
	0	4	101

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Drilling, when used in a complete manner, runs the farmer to high expences, and he has need of a very good crop to repay it. Thus in the above instance, stance, the broad-cast is superior in profit, though its product is much less than that of the former."

"EXPERIMENT III.

Culture, produce, and expences of half an acre of the fame field, in two divisions. 1761.

Plowed, for the first time, in autumn, 1762. Twice more in the fpring, 1763, and harrowed twice. In the succeeding summer, it received three earths more. The first week in September it was ftruck into two equal parts, and one half plowed into five feet ridges, the other into ridges of three The week after, the whole was equally manured with eight loads of coal-ashes, mortar, rubbish, and virgin moulds, mixed together in equal quantities. At the end of the same month, the five feet beds were arched up, harrowed and drilled in three rows, eight inches afunder, with a peck and an half of wheat, and the common ridges plowed and fown with two pecks of the same wheat, on the same day; and the whole water-furrowed. The fucceeding year, the broad-cast rood was thiftled twice, and the drilled one horse-hoed four times, hand-hoed three times, and hand-weeded They were reaped on the same day, the first week in September. The broad-cast somewhat laid, but the drilled upright.

Account of the Broad-cast rood.

EXPENCES.

				1.	s.	d.
Eight plowings Two harrowings	-			0	2	0
Two harrowings	-			0	0	2
Labour, manuring,	and	cost of	the			
ashes and mortar				0	7	3
Seed	•		•	0	2	7=

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-93	1	, 1	2.	d
Brought over	in the	0	12	04
Sowing		o o	0	12
Water-furrowing-twice	To the mi	aon lyb	ī	0
Thistling twice -		0		0
Reaping		0	I	2
Harvesting		0	0	8
Threshing -		ŏ ·	I	9
The state of the s			CENTER!	
1 10x 10 1 10 10 10 10 10 10 10 10 10 10 10 1		0	17	10
Rent, &c.	2	0	8	6
			***	in Zu
	1040	1	6	4
PRODU	JCE.			
Seven bushels, at 415.		1	15	101
Expences		1	6	4 -
		Morta Fin.		
Profit, at 11. 18s. 2d. per a		- , 0	9	61
DI .	1. 5		e for h	
Plowing -	SALLES CONTRACTOR	3 0		inchie.
Harrowing -			*****	
Carting manure - Carting in harvest -		0 0 3	-	HIT
Carting in narveit		0 0 4	To de	HI
		0	10	11
The above profit -		0	9	61
		100	,	
Loss, 2s. 4d. per acre	•	- 0	0	7
Constituting the second desirable of		_		
Account of the	drilled r	ood.		
EXPE	CES	\$10 OU		
Eight plowings -		0	2	0
Three harrowings -		0	0	3
Manuring -		- 0	7	3
Seed		0	I	3
Drilling	123	0	0	13
Water-furrowing thrice		- 0	1	6
and the second s		1	- 1	2.375
-0		0	12	94

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Profit

This is a very great superiority in favour of the common husbandry.

"EXPERIMENT IV.

Culture, expence, and produce of half an acre of a field, the foil light, gravelly loam, in two

divisions. 1764.

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This piece was plowed once in autumn, 1762. Again in the spring of 1763, and four times more the following fummer. Struck into two equal parts the first week in September, and one thrown into five feet beds, the other into common ridges. In the middle of the month, arched up the first, and drilled it in three rows on each ridge, eight inches afunder, with three pecks of wheat; and the same day plowed and sowed the other half with a bushel of the same grain.

The broad-cast was thistled once the following fpring and fummer. Reaped the whole the last week in August. S. d. Produce of the drilled 7 0

Ditto of the broad-cast

Superiority of the latter

Account of the broad-cast half acre.

Eight plowi	ngs	-		0	4	0
Seed -		-	•	0	4	6
Sowing		-	•	0	0	3
Thiftling	-		•	0	0	9
Reaping				0	2	0
Harvesting			-	0	I	2
Threshing	• ,			0	İ	93
				0	14	53
Rent, &c.			• -	0	17	0

II

Profit, 18s. 42d per acre

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PRODU	JCF		4 7 7		
			1.	5.	d.
Seven bushels and 3 pecks,	at 42	s.	- 2	0	8
Expences	lette:		1	11	5
Profit, 18s. 41d. per acre		-	0	9	24
	1.	s.	d		Luca A
Plowing -		6	0		
Carting in harvest -	0	0	1 3	965	chi,
	23. 12. 12.13	10	0	6	13
Profit, 6s. 1d. per acre	•	-	0	3	01
. Account of the dri	lled h	alf	acre.		
EXPEN	CE	S			113
Eight plowings -			0	6	0
One harrowing -			0	4	2
Seed	bell	nb:	0	3	41/4
Drilling	Alle of		0	0	
Four horse-hoeings -		-	. 0	1	4
Three hand-hoeings -	23781-	061	0	3	6
Reaping and and and	-15		0	I	9
Harvesting			0	0	9
Threshing -			0	I	9
8 0 0 - 5 1.77 7 8			_		100
0 0 0				16	91
Rent, &c.	16. 15.0	-	0	17	0
PRODU	ČE		T	13	9+
	C L.			-6	1.1
Seven bushels, at 425. Expences		-		16	9.
Profit, 5s. 11 d. per acre	//- 11	•	0	2	113

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The In the beds At to were rows

Plowing

L 197	7			
bee beviely send to be and	1. s.	d.		
Plowing -	0 6	0		i
Harrowing 1	0 0	1 1		
Drilling	0 0	13		THI
Horse-hoeing	0 0	10	3.0	the state of
Carting in harvest -	0 0	134		
0,1,1		-	.46	10
0 7 0 2		0	7	3
The above profit -		0	2	113
0 2. 6	and diffe	9		10270
Loss, 8s. $6\frac{1}{2}d$. per acre		. 0	4	3 =
COMPAR	ISON.	-		
Profit by the broad-cast		0	3	01
Loss by the drilled -	- 8	0	4	34
Superiority of the former		0	7	3 3 4
		117		

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wing

In this experiment, though the drilled crop yielded more than he who fowed it could have expected from its appearance, yet the broad cast maintained its superiority, so that there appeared no great prospect of the success of drilling, yet a few more experiments will be recited, in order to give each method as fair a chance, as possible, of being brought under a just and impartial consideration.

"EXPERIMENT V.

Culture, expences, and product of half an acre of the last mentioned field. 1764.

This was plowed for the first time in October, 1762. The year following it received four more earths. In the middle of September it was thrown half into beds five feet wide, and half into common ridges. At the end of the same month, those of five feet were arched, harrowed up, and drilled with three rows of wheat eight inches a sunder; taking a peck

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and a half; and the three	feet ones	plov	ved	and
fown in common with two p				
In the year following the				
thistled once, and the drilled				
and hand-hoed three times;	reaped th	e fa	me	day.
—The Product	La Alia Visia	q.	b.	p.
Of the drilled -	-	1	1	0
Of the broad-cast	-	0	7	0
	and the se	-	404	A - 4 1/4
Superiority of the former	•	0	2	0
		-	7.	
Account of the dr	illed rood	-		
PART BOX.	60 013	I.	s.	d.
Seven plowings -	S. Fad'e	0	I,	9
One harrowing -	in the state of th	0	0	I
Drilling -	-	0	0	01
Seed -	•	0	1	8
Four horse-hoeings -	•	0	0	8
Three hand-hoeings -	Marin Spring	0	1	9
Reaping -		0	I	9
Harvesting -		0	0	6
Threshing	5 5	0	2	3
		-		
		0	9	83
Rent, &c.	•	0	8	6
		-		-
		0	18	21
		1.750	** ** *	
PRODU	CE.			10
One quarter and I bushel, at	425	2	7	3
Expences, as above -	aya hai s	0	18	21
Profit, 5l. 16s. 1d. per acre		I	9	O't
			بينه	
	1. s. d.			
Plowing	0 2 7	1		
Harrowing	0 0 0	3		
		14.7		
		0	2	81
			-	

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		L		d.		
Brought over Drilling -		0	2	8 1 0 3 0 3 1		5
Horfe-hoeing -		0	0	5		
Carting in harvest		0	0	03		
- : : : : -			30	na v	11.01	1347
green, disposable the improving				0	3	234
Clear Profit, 51. 3	s. 2d. per	acre	Nov	16.4	5	91
Account	of the broa	id-c	aft r	ood.	4500	1.7%
	PENC		1	i	· s.	d.
Seven plowings	•		-	0	1	9
Seed 4 T	MAMA		4	0		3
Sowing -	esphara i			8	0	15
Thiftling -	morti.	dol.	Stor	0	9	1000
Reaping -		•		. 0	Í	8
Threshing -				0	1	9
connected the sun	di elit ei e	1015		11.411	at h	9
wit our fritalities	willi de		xil.			101
Rent, &c.	h to almo	•	1 .	0	8	6
ed nlessions of	i no have i			- o	16	**
	diam ban		onn	, boyal	ories	42
P. Or to the or P.	RODU	CI	E.	ebnű	19 7	enone)
Seven bushels, at	42s	4	-	I	16	9-
Expences -				O	16	4=
Profit, 41. 1s. 6d.	per gore				•	Trigation
210Ht, 41. 13. 04.	per acre		900	d only	bell	13
· ·		1.	s.	d.		
Plowing -	- 110	0	2	71		
Carting in harvest		0	0	03/4		
A STOREM OF STREET		-	-	****		
				0	2	8 4
Clear profit, 31. 1	or ad ner	acre			17	8:
cical profit, 31. 1	O 4	acic			-/	07
	- 4					

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COMPARISON.

Profit by the drilled,	-		5	3 2
Ditto by the broad-cast	(F = 1	4 Nov	3	10 9
Superiority of the former		- //5*.	I	12 5

This great profit, notwithstanding an excess of expences, seemed to contradict the former experiment, and to argue much in favour of the new husbandry."

"EXPERIMENT VI.

Culture, expences, and produce of half an acre of land in the same field, in two divisions. 1762.

The tillage was in most respects as before. In November, 1762, it had the first plowing. It was stirred four times more in the spring and summer following; the sixth earth threw half of it into sive feet ridges, and ten loads of dung and moulds mixed together, were spread on the whole. In the first week in October, the five feet ones were arched, harrowed, and drilled with three rows, eight inches asunder, taking a peck and an half of seed; and the others were plowed and sown in the common way, with two pecks. The broad-cast rood was thistled once the succeeding year; the drilled, horse-hoed four times, and hand-hoed thrice; both repeated the same day.—The produce

Of the broad-cast	- ,		b.	
Of the drilled		0	7	ľ
28 0 4 7 0		0	11 10	3
u gil, per ax e - o i z si	24\(\frac{1}{2}\)	-1	Acco	ount

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Account of the Broad-cast rood.

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or 3

Account of the Broad-Cast F	00u.		Pro- T
EXPENCES.	1.	5.	d.
Seven plowings	0	1	0
Seed		2	
Labour, and cost of the manure -		12	
Sowing		2	11
Thiftling		0	The second
Reaping -		i	
Harvesting	0	0	9
Threshing		2	
La de la consequencia de la cons	_		
3 0 11	1	0	91
Rent, &c	0	8	6
THE RELEASE OF THE PROPERTY OF THE			
A contract to the second	1	9	31
PRODUCE.	-		
One quarter, 1 bushel, at 40s	2	5	0
Expences	I	9	31
	-		
Profit, 21. 3s. 2d. per acre -	0	15	91
	1, 20	W.C	
1. s.	d.	. Of the	
Plowing 7 - 0 2	71	EA	178,176
Manuring 0 10	21	E.S.	
Carting in harvest - o o	03		
	-		- Inc
San San San Land	0	12	103
10 H2 ID 200 - 10-73 Bird.	_		
Clear profit, 11s. 7d. per acre -	0	2	103
ON ON HEAD WILL	· -		
Account of the drilled ro	od.		
EXPENCES.		s.	d.
Seven plowings	0	I	9
One harrowing	0	0	1
ivianumg	0	12	0
The state of the s			
	. 0	13	10

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renders it necessary (as Mr. Young observes) to persevere the longer in experiments, in order to ascertain any point in husbandry.

"EXPERIMENT VII.

Culture, expence, and produce of half an acre in the fame field, in two divisions. 1764.

Plowed in March, 1763, and received but three plowings more, the last of which threw one half of it on to five feet ridges; and the other, as is common, to three feet ones. The second week in October, the first were arched and harrowed, and drilled with two rows, one foot asunder, taking a peck and an half of seed; the other half was at the same time plowed, and sown with two pecks in the common way. The land was not in good order for drilling in respect to sineness, many clods remaining hard and large; but, according to the general notions, the broad-cast part was in sine order. The latter was thissed once, and the former horse-hoed four times, hand-hoed thrice, and hand-weeded once.

The broad-cast was reaped; but the drilled was remarkably green, and could not be cut till eight days afterwards; on account of which it suffered by wet weather.—Product q. b. p.

by wet weather.	Toduct		4.	U.	P.
Of the broad-cast	Siliab antito	in u rcus	0	5	0
Of the drilled	5 5 0 F		0	2	1

Superiority	of the former	-	i tad	0 2	3
C.L.				- Area	3

Account of the broad-cast rood.

EXPENCES.

	1 0			- 43	us est	1.	5.	d.
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The difference in this experiment being very great, must be attributed to the fault of the drill culture, in some situations. The preparation by plowings, &c. it is true, were not so good, but yet they were, for a gravelly soil, neither slovenly,

nor for any other mode of fowing indicated bad husbandry;—the same land, we find, with the same culture, under the broad-cast method, yielded a beneficial crop; and the hoeing and weeding of the rows were not incompletely performed. The deduction of price in the drilled culture, was merely the effect of that method, in being exposed to the accidents of the weather longer than the other; all such events, though accidental, are rationally to be laid to the account of that method which occasioned them.

The general account of these trials will stand as follows:

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BROAD-CAST.

· Williams	Loss	Profit.				
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IL.	0 3 1	0 0 0				
III.	0 2.4	0 0 0				
A Mary In America	O II 21	and Nothing 1 to				

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Lofs	Profit.
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Brought over 0 11 2	000
Experiment IV. 000	0 6 I
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VI. 0 0 0	0 11 7
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Profit by the broad-cast Loss by the drilled	5 5 7 1 18 3 1 1 18 3 1 1 1 1 1 3 1 1 1 1 1 1
The broad-cast better by	7 3 11

The superiority here is great, indeed, in favour of the broad-cast husbandry, which some are inclined to think so disadvantageous, in comparison of the new method. Mr. Young observes, that is it should be objected, in respect to such experiments, that the charge of a year's fallow on every crop is not according to the nature of the new husbandry, which is founded on successive ones, it may be answered, that it is precisely the same with the old; since though that admits not of the same crop every year, yet it admits some crop or other every year, and such as are equally profitable with wheat itself.

Having drawn the comparison so far with regard to the different methods of cultivating wheat, I shall defer saying any more upon that subject till I come to compare the new husbandry with the old, in a particular part of this treatise reserved for that purpose, I shall now add something farther concerning the time of sowing, with which I shall conclude this chapter.

The

The ingenious Mr. Young, whom I have to often occasion to quote, says, his original opinion was, that early sowing must, in general, be pernicious, for the old reason which has been already mentioned, namely, that of allowing the weeds to rise strong before winter; but, he says, after frequently sowing late, he began to think that opinion was fallacious, and therefore determined to submit it, like others, to a fair trial.

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After a feries of experiments which he made for this purpose, he gives it in favour of corn sown in the month of September; though, in some of these experiments, there were instances of its having grown well when not put into the ground till the middle of December. He says, likewise, that it appears, the late autumnal sowings require more of manuring, while the early ones are rather the

worse for the dung.

"The early-fown (fays he) required a thorough weeding before winter; in respect of tillage after fowing, this was all the difference in the expence (plowings excepted) between fowing in July or Auguft, or in September or October .- As to the objection, of the early corn's being over-run with weeds. -This, he afferts, would have been no obstacle to the earliest sowing, had it proved otherwise beneficial. For (adds he) upon a supposition, that the fallow could not be so soon freed from weeds, yet the crop admits the most exact cleansing. I have often had broad-cast crops cleaned from all forts of weeds by hand-work; and by an earlier growth of them, fuch a work might be performed fo much the easier; and if such a system was not approved, that of hand-hoeing with small three or four-inch hand-hoes would effectually answer every objection. Upon the whole, I may affert from experience, that in broad-cast sowing the additional cleanfing from weeds, on occasion of the corn's being

being fown early, will not upon an average of feveral years amount to above five shillings per acre, supposing the fallow to have been managed as it ought to be in common husbandry, viz. The tillage to begin in autumn, or before: but as to the execrable method of not beginning to plow till barley is sown, I certainly need not add, that, with such a conduct, a very early sown crop must stand a chance of being absolutely destroyed."—We have already observed, that there are some who recommend sowing even in July, but it does not appear that their opinions have been supported so well as Mr. Young's, by an uninterrupted course of experiments.

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Of Barley; its Gulture, the proper Time of sowing and reaping;—the Manner of managing it, according to the old, and new Husbandry, with Experiments relative to each; and a Comparison between them.

A FTER the culture of wheat, that of barley comes regularly next under our confideration. This grain is distinguished by Mr. Miller, and others, into four species; namely, 1. Spring barley, with many rows of grain. 2. The common, long-eared barley. 3. Barley with shorter and broader spikes, commonly called sprat-barley; and, 4. The winter, or square barley, which is also called big.

The first of these, which is the common spring barley, most generally cultivated in England, is again divided into two parts—the common, and the rath-ripe barley; which last Mr. Miller takes

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to be only an alteration of the former, occasioned by its having been long cultivated upon light, gravelly ground; this opinion is supported by some experiments made, as we have been informed, of the feeds of this barley when taken from fuch a foil, and fown in a strong, stiff land, ripening near a fortnight fooner than others of the fame kind taken from firong. For this reason, farmers in the vales will purchase their seed-barley from the gravelly up-lands; but it is often found, that after two or three years culture in the vales, it becomes as late in ripening as that which is the usual growth of the place; whilft, on the other hand, the farmers in the up-lands procure their feed from the stiff land in the vales, that the grain may not degenerate in fulness and in bulk. This fort of barley is diffinguished both by the thinnels of its chaff, and the double row of beards, or awns, which stand erect upon it.

The grains of the common long-eared barley are regularly ranged in a double row, lying like the tiles of a house over one another. This is cultivated in most parts of England, though some farmers object to it on account of the length and weight of its ears, which they say must render it

the most likely to be lodged.

The bailey called sprat-barley, or sometimes. Fulham barley, on account of the quantity of it there cultivated, has shorter and broader ears, and longer awns, which are useful in preserving it from birds, and has ears closer set than either of the other forts, which it seldom equals in height; nor is its straw, which is coarse as well as short, estremed so good fooder for cattle.

That which is called bear-barley, or big, is feldom cultivated in the fouthern parts of England, but very much in repute in the northern counties, and in Scotland; because, being of a hardy nature,

it belt bears cold. There are reckoned two forts. of it, the one with four rows of grains, commonly called four-rowed barley, the other with fix, which last it is that is generally distinguished by the name of barley-big. The rind of this is thicker than that of the other forts, for which reason it is less valued by our matriters. Both of these are generally fown in autumn, nearly at the same time as wheat, not only in temperate, but also in cold countries. In January, February, and March, they are frequently fown in the hot countries.

Barley is generally esteemed to delight particularly in a dry, rich, light ground, fuch as the black mould, and fuch clays as lie dry, especially if these laft have been well manured with dung, ashes, lime, or chalk. Soap-ashes have been recommended, as serving greatly to improve this grain; and pigeonsdung, malt-dust, and soot, have been found some-

times to be of great efficacy.

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The common time of lowing barley, if the weather be dry (a circumstance to be attended to) is early in March, for very dry, light land; but in strong, clayey foils, it is not fown till April, sometimes not till the beginning, or even the latter end of May; but in this case, if the season does not prove very favourable, the autumn must be far advanced before the crop is fit to mow, unless it be of the rath-ripe fort.—But Mr. Lisle thinks, that this fort should be sown as early, or earlier, than any other; and adds, it should be sown on a icher soil; yet in Wiltshire, where a great deal of this fort is raifed, it thrives perfectly well on a poor, landy foil, which contradicts this argument. It s generally thought, however, that this species of orn should be sown in a strong soil, because its traw being hollow and weak, it will be lodged the nore eafily.

One of Mr. Lifle's experiments is the following: He fowed in Hampshire, in the year 1707; Frank ripe barley in very poor, white groundy and fome of the fame fort of grain in very good, altrong clayey land. No rain fell to bring it up who june, after which there was plenty of wet till harvest time. The rath-ripe barley in the poor, a light land, was much bent, broken in the ftraw, beaten down, and entangled. In the ffrong, clayey land, the fame fort of corn suffered the same inpuries, but not in fo great a degree; but the straw and leaves of the rath-ripe barley in both places were blighted, and full of black specks, their ears were thin, and their colour was loft; but the late ripe barley in a field adjoining, was free from thele spots, and stood upright in full vigour. but rom hence he infers, that fince the clayey sland in the hilly county of Hampshire, though in good hear if in a moist year, yet could not sufficiently feed the straw of the rath-ripe barley, so as to enable it to stand upright, this fort of corn is not proper for fuch places, and that it is better there to low late ripe barley, even though, in order to get the feed into the ground before the beginning of May, three or four horses extraordinary should be provided against sowing time.

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On the same occasion, Mr. Liste made another observation concerning the accidents that rathripe barley is subject to in such dry springs; namely, that one half of the feed which fell deep came up without rain, but the rest did not sprout till the rains came. By reason of the weakness of the stems, the half which came up first could not wait for the ripening of the latter edge-grown corn in the fame field; but its fraw bent, broke, and was entangled; and the ears buried themselves among the broad clover, fown with the barley, fo that he was barle forced to cut it, not being able to stay a week ing longer

longer for the edge-grown corn to ripen; whereas, the late-ripe barley frood fo upright with its fraw, that that which was first ripe might be well allowed to flay for the rest to ripen, before it was to be claver lands. No rain tell to bring it uniwob tuo

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In the year 1706, the lame gentleman fays, that he had another proof of the firaw of rath-ripe barley being thinner and weaker than that of the late ripe forten All his rath-ripe barley, of which he fowed fifty acres in different forts of ground, and some of it side by side with late-ripe barley crumpled down in the straw, while the late-ripe barley of the fame forwardness and growth, stood and their colour was ruogiv in this their que

Mr. Lifle after observing farther, that if the ground be good, and the year a feeding one, rath-ripe barley will frequently run rank, and fall while green in the ear, which causes the grain not to fill, concludes, that this grain should be fown early, should not be exposed to the north, and should be accommodated with a good foil. For we know (fays he) that the poorer the ground, the weaker and poorer the growth will be in all forts of corn; and if the rath-ripe barley has by nature a weaker and thinner fraw than that which is late ripe, much more will it be 10, when the straw is rendered much thinner and weaker than naturally it would be, by the poverty of the ground in which it is fown. It is very evident to me, that the rathmpe barley ought not to be fown on poor ground, and much less to in case it lies declivious from the came. By reason of the direct and abrewoffend

the on The middle tripe, for common spring barley, fame bears little fowing even on ground declivious from the fun, better than the rath-ripe fort, but not g the near to well as the late-ripe, or common, long-eared was barley, nor will its stalk stand so long. Accordweek ing to Mr. Lifle's experiments, late-ripe backy iograph.

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will endure being fown when the ground is wetter than will do for the rath-ripe fort, and that a bottom-ground, or a vale pent in between two hills, though shaded by one from the sun, will, by means of the warmth and closeness of the air, often ripen corn as fast as a ground lying declivious to the sun. In a field which he sowed with middle-ripe barley, (the common spring-barley) the lowest part lying on a flat ripened regularly, and even sooner than another part of the field which lay upon the side of a hill declivious to the sun; but on that side of the same hill which sloped from the sun, the corn was more edge-grown, lay backward, and neither looked so white, nor was so ripe.

Where land lies both dry and healthy, and wherein mellowness and lightness are joined to strength of soil, it is that which is thought to produce the best bodied and thinnest-coated barley, qualities which always recommend this grain, particularly to the malsters. Such, generally, is the barley of the growth of hilly countries. But poverty of soil is by no means requisite to land, in order to its carrying a plump and thin-eared barley; though it is allowed that even poor land, which lies dry and warm, is better suited to this grain than rich land which is wet, because barley does not so much want strength in the land, as

healthiness and warmth of soil.

The fort of barley generally reckoned best for sowing, is that which is not blackish at the tail, nor has a deep redness, but is of a pale, lively, yellow colour, intermixed with a bright whitishness; and if the rind be a little shrivelled, it is so much the better, that shrivelling being occasioned by its having sweated in the mow, is a sign that it has a thin rind. The husk of the thin-rinded barley being too stiff to shrink, even when the flour is shrunk from it, will lie smooth and hollow. A change of seed

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keed is particularly recommended by most of those who treat of this grain, as being particularly serviceable to barley, which otherwise might become coarser and coarser every year. The seed of the common barley sown once in the hot sand at Patney in Wiltshire, has retained the faculty of ripening sooner than any other fort for some years, if it continues to be sown in such ground; and it is found that it will lose this quality in two or three years when sown in cold, clayey land. But it always behoves the husbandman to take care that his seed be full-bodied.

From a heap of barley, Mr. Lifle took fixty grains of different fizes—twenty of the biggest twenty of the middling fize-and twenty of the smallest corns. He planted the twenty of each fort in three feveral pots, with a rich fort of the fame mould in each. In nine days time, thirteen of the fullest grains were come up, nine of the middling fized, and only five of the fmallest, and the plants of the plumpest corn excelled those of the others both in colour and breadth of the blade. In three days after he found nineteen blades of the largest fort come up, seventeen of the middling fize, and thirteen of the smallest: and in three days the blades of the best and middling fort were all come up, whilst only feventeen of the worst had sprouted, with such disadvantages in colour and strength in these last, that shewed that many of them would not have come up at all, had it not been for the richness of the soil.

The common method of steeping wheat is generally esteemed as highly beneficial to barley. The reason given for extending this to all spring corn is, because rain cannot be depended on so soon after the sowing these as the autumnal grain: and by the same reason, the later the spring-corn is sown, the more necessary is this precaution. But where peo-

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ple do not chuse that their barley should be limed, for fear of intense hot weather's conjing on, other aso advised to sprinkle foot over it which gato least will have a chance of preventing its being preyed upon by infects. There is another circumstance which is no less recommended to the husbandman. We are told of a farmer who (being obliged to attend other business in the course of the morning, fowed his corn at break of day, and harrowed it before fun-rife. The grain thus early fown outitripped the rest which was fown on the same day after the fun was up, and, besides, had in every respect a better appearance, though it grew in the worst part of the field. It was probably the dew which had this effect, when buried with the corn, At leaft, it is worth a trial doidy vd bodsom sids

It is most common to sow barley either after a fallow, or an etch or second crop. When it is after a fallow, the land is advised to be plowed in small ridges, and at least three times; the first plowing to be laid in small ridges, to remain all the winter so, in order for the frost to mellow it. But if another plowing was given in January, or in the beginning of February, the ground will be still better broken and prepared. These ridges are to be split, and the ground to be well harrowed, and laid smooth, and, if possible, should be plowed the same day, in order to sow: though in strong, wet lands, the best way is to lay it round, and to make deep surrows to receive the water.

In June, at the time of twy-fallowing, they make the land very fine, and low it with turnips, which they feed off with sheep in the winter, and plow it up in March, and order it as before; whilst others, who take this method, give it but one plowing just before they sow, in the month of March, When barley is sown upon an etch after wheat,

When barley is fown upon an etch after wheat, they plow up the wheat stubbletin as dry weather as they they can, as foon as the time of fowing wheat is over; and lay three ridges into one, if they have dung to spread upon it, but if they have not, they plow it into small ridges as already mentioned, that it may lie the drier, and be the better mellowed by the frost; they then plow up again in March, or-

dering it as before.

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We are told by Mr. Mortimer, that a farmer in Effex, who lived near a market-town, from whence he had a fufficiency of dung, used to sow his land with barley and clover, reaped the corn at harvest, fed the clover all the winter, and from spring till the middle of July, when he fallowed his ground. The next spring he sowed it again with barley and clover, and every year repeated this method, by which he got large crops. The land was a light, rich mould, somewhat inclining to a gravelly bottom.

Barley is mostly fown in broad-cast upon land laid inside ridges; though, in order to provide against drought, some have thought it would be better sown under furrow, or with the drill.—The experiments which will fill some of the subsequent pages, will best enable the judicious farmer to judge which of these is the best and most profitable

merhad

"If the dung of pigeons, poultry, or any other kind (fays my author) be feattered over barley, or wheat, after the grain is fown, as it is frequently done, it should be strewn immediately, because then the shoot will easily make its way through; but when laid on later, it burns up and rots the blades of the young plants. When the barley is sown, the ground should be rolled after the first shower of rain, to break the clods and lay the earth smooth, that it may be the better mown when ripe, and also to make the mould lie closer to the roots of the corn, which will be of great service to it in

dry weather. About a month or lix weeks after the barley is up, it should be rolled with a pretty heavy roller, which will again press the earth close to the roots of the plants, and preferve them from being hort by the fun or drying winds, particularly in dry feafons, and will greatly contribute to ftrengthen their stalks, and make them tiller. A few thowers before harvest will help to make the rind of the grain fine and thin. If the corn grows too rank, as it is fometimes found to do in a wet spring, mowing is then much better than feeding it, because the scythe takes off only the rank tops, but the sheep feed upon all indifferently to hor should they in any case ever be left upon it too long, because being particularly fond of the fweet end of the stalk next the root, they will bite to close as to injure the future growth of the plant.

Barley is ripe when the red roan, (as farmers call it) meaning a reddish colour, is gone off from the ears, when it bends down its head, and when the straw has lost its verdure. It should not be cut till then; for though the grain of some ears which stand upright, may feem to be full hard and dry, yet their straw if carefully examined, especially at the knots, will still be found to be greenish, and will therefore be apt to heat in the mow, which will render the grain unfit for malting, or, indeed, for almost any other use. If it should be full of weeds, it must lie in fwarth till they are dry, which may be the more eafily done, as this corn is not apt to shed, but rather inclined to sprout or grow musty in wet weather; for which reason, it should be shook up and turned every fair day after rain; and as foon as it is grown dry it may be made up into cocks, though it must not be housed whilst any moisture remains in it." q won that I

It is an observation of Mr. Lisse, That poor, thin barley and oats should be cut rather sooner

than those which are strong and vigorous, for that the straw, when they are full ripe, will not stand against the scythe. The barley, in such case, in particular must lie in the swarth till it is thoroughly dry. Mr. Lifle has an instance of some of his which lay out in the fwarth for above five days in fine weather, though both blighted and edge-grown, grew plump, and acquired very near as good a colour as the best. He reckons short scythes the best for moving lodged or crumpled corn, alledging, that they miss the fewest plants; observing also, that a bow upon the scythe, which will carry the Iwarth away before it altogether, is preferable to a cradle, the fingers of which might be likely to be pulled in pieces in the motion of drawing back the icythe, by the corn that was intangled.

It is generally thought, that one person is sufficient to rake oats after the cart, unless in a high wind; but though the wind should be never so still, and the weather never so fair, to rake after the barley cart, two persons are always deemed ne-

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The liquor most used in this country being made from this grain, the husbandman ought to be particularly attentive to the culture of it. The common spring and the common long-eared barley are generally best esteemed for malting, because their rind is hardest and thinest. The square-eared barley, called big, is very little used or valued by our maltsters, because it is of a contrary quality; yet in Scotland and in Flanders they use this sort of grain for supplying their breweries.—It is also used alone, or mixed with wheat in making bread, which is not very well slavoured, and is generally reckoned rather hard of digestion.—

I shall now proceed, as I promised, to give some experiments made upon this grain, which have the same authority as those I have already given upon

the culture of wheat. With those, and the observations upon them, I shall dismiss this subject.

Carting in In T' N I N I R I Y X X X

Culture, expence, and produce, of eleven acres of a field, the foil a loose woodcock loam on the furface, with a clay beneath, 1764.

This field was part of a farm taken at Lady-day, 1763, the fallow year intended for wheat at Michaelmas; but the feason not proving advantageous, it was ridged up during the winter for spring; corn. It was sown with barley in 1759, in 1760, with oats, in 1761, with clover, and with wheat in 1762.

. b holded by the BY OE S. and the har-
Six plowings 10 bnoon vine which 3 6 0 Water furrowing 0 15 0 Five quarters, 4 bullhels of feed, at 20s. 5 10 0 Plarrowing once 0 1 6 Mowing 0 12 10
Water furrowing 0 15 0
rive quarters, 4 bullhels of feed, at 20s. 5 10 0 through 1250 and 10 20s. 5 10 0 through 1250 and 10 20s. 5 10 0 through 1250 and 10 20s. 5 10 0 through 1250 and 12
colour du relled up. This pair of the month
Harveffing on Devorater-Fair owed, on 12 0
tighting to the sealon, because or the lagainstaint. After harvest, the date brown colour of the stubble
inficiently directed to the wet spots of the field.
Rent 18 c. 100 voltage the strate own of the strate own of the strate own to have those the strate of the strate o
occasioned a great laving, had it been performed the preceding winter. Where the wet had not
ruined the cropath rayyes or ground for four or
Twenty-two quarters, at 195 20 18 0
One ditto, three bulhels icreenings o 13 o
coldure, expences, and produce of a rood in a fe-
Expences to relimbly the foll nearly themlar to test to 4
8 Ploughed first in autumn, great From thorse to Michael mas to 64, it received eight clear earths.
Plowing

and the object	lith thole,	N lears,	d'annius de
Plowing	diffulls the	4.49	vations upoR tl
Harrowing		0 2	9
Carting in har	vest and	IN PIS	(34)

The above produces woodened leaved acres of the above produced woodened to am on the above produced woodened to the above produced t

Lors, os. 6d. per acrel a louise was blage ad T6;

Two quarters, one bushel, per acre, was the whole amount of this crop, as specified above. though, confidering a year and half's clear fallow. and fix plowings given to the land, double that quantity might have been expected. The fowing was finished by the thirteenth of May, and the harvefting on the twenty-second of September. A wet fummer ruined the crop on the flat part of the field, so that in some near four acres of it were dead, the stalks of the grain being of a dark brown colour, quite shrivelled up. This part of the field was not fufficiently water-furrowed, on account of trusting to the season, because of the late sowing. After harvest, the dark brown colour of the stubble fufficiently directed to the wet spots of the field. Some hollow drains were therefore dug through those low parts, an operation which would have occasioned a great saving, had it been performed the preceding winter. Where the wet had not ruined the crop, there was straw enough for four or five quarters per acre, but the ears were short and thin.

"EXPERIMENT II

Culture, expences, and produce of a rood in a fecond field, the foil nearly fimilar to that of the former. 1764.

Ploughed first in autumn, 1762. From thence to Michaelmas, 1763, it received eight clear earths;

was twice rolled, and three times harrowed. The last plowing, threw it on to ridges for the winter, and turned in five cart loads of rotten farm-yard dung, that had been turned over several times; it was left water-furrowed. It was plowed thrice more in March, and again the first week in April, and harrowed in three pecks of barley seed. In August it was mown; the produce one quarter and sive bushels.

Inot proba-	EXPE	NCES	e been	ved "	villing
AND THE PARTY OF	***	ed for bl	Vourab	stred c	4.189
Eleven plowings Five harrowings			- 0	2	9
Two rollings	MENT	其為其	9 %	0	7.
Manuring Water furrowing	10 500000	find had	o da da	la falm	9
Water-furrowing					
Seed moist	s tallower	wile wa	96 HKG	id-sii	0
Mowing and har	Actringuis	. Pincha	200	I QIM	8
Threshing	vorted san	is bas es	Salmon	0	6
Rent	us loads o	return or	no been	IN OUT	O W
and morrer	ma Indo	Jun 200	o bas	E CO	TOTAL Company
in the first,	absoluted	- Fundam	0	19	55
Mily basta	DDOD	HCF	arch	27L 11L	21337
	PROD				
One quarter, five	e bulhels,	at 20s.	1	12	6
Expences -	multynib	e luscee	- 10	18	5 2
pateroried unon		all tenin	choace to	interior.	000
Profit, 21. 16s. 20	d. per acre	XIP E. I		14	0 1
Plowing -	plan talk s		11		
Harrowing -		0 0		welq:	trigi?
Rolling -	ZEM I	0 0	0	narroy	ive
Manuring	· toubord		0		
Carting in harves	1 1400		03-		
9 2 0				5	
Clear profit, 11.		er acre		. 0	- 3
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Without the exertion of any extraordinary huft bandry, yet here is an extraordinary crop. Farmers are generally of opinion, that a furnmer fallow alone is sufficient; and therefore (as Mr. Young observes) think little of manuring the same year; but this experiment proves (as indeed several others have done) that it is most profitable to try every principle of good husbandry on the same land, as most of the expences to a great crop are the same as to a small one. This crop would, in all probability, have been greater, if it had not proved a season unfavourable for barley.

Five harrowing T N A M I S A A A T Two rolling II

Culture, expence, and produce, of a rood in a third field, of a fine light gravelly loam. 1764.

This piece likewise was fallowed. From the autumn, 1762, to Michaelmas, 1763, it had received six plowings, and three harrowings, and was twice manured, once with six loads of rotten farmyard dung, and once with coal ashes and morter rubbish mixed together, four loads. In the first week in March, it was plowed again; and at the end of the same month plowed, and sowed with a bushel of barley, and harrowed sine. It was once hand-weeded in the succeeding summer. Product two quarters one bushel.

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lear profit, 1st 135. 11d per acre c. EX X5

It is observed upon this experiment, "That it is one of those instances which ought to teach us not to place too great considence in the stories we are told of vast profit from vast crops where the manure is purchased.—Though the observation is chiefly applicable to the first crop, as such improvements are selt in their good effects for succeeding years, which argument is in favour of the general profit of manuring.

Loss, 21. 11s. per acre

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"EXPERIMENT IV.

Culture, expence and product of a rood in the fecond field. 1764.

This piece was also fallowed from the autumn of 1764, when it was plowed on to the ridge. It was stirred twice more by the middle of April, the latter of which turned in four loads of farm-yard dung, that had been well mixed together, and was pretty rotten. It was plowed again in May. The fifth earth was given in June, turning four loads more of the same manure. In July the fixth was given, in August and September the seventh and eighth. In October spread over with four loads more of this manure, turning it on to the ridge for winter. By the end of March, plowed and fowed it with one bushel of barley, It flourished well; but in the beginning of July was much beaten down, though not flat. It was cut in August, and threshed immediately. Produce two quarters, five bushels, and one peck.

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m		bistori		ww 2.1	1.		d.
Ten plowings	nel 51	-	hard to	-	0	2	. 6
Two harrowings			-		0	0	3.
Three manurings	Maxa	शामी ।	ogu É		0	6	0
Seed of or regue							
Water-furrowing	tence	comfic	36319	000 :	0	9	6
Mowing and har	vestin	frois	i Books	vall	105	0	IO
Threshing do ad	i dar	od P-	- balad	s with	0	2	9:
op, as fuch im-	ak e	the fi	01.5	Licab	qua	1.12	44
d effects for fue	9000	their	felt it	276	0	15	04
Rent, &coval ni	ST 1U3	menne	s doids	27	0	8	6
S. 1. 1. 6.		.gnit	mant	to 18	OH	152 13	X118
0,100				200	1	3	10
100		44			-		

[226] PRODUCE.

Two Anarton	ba	.1	1			5.	
Two quarter Expences	s, 5 buil	eis, i	peck,	at 2	1	3	10
Profit, 51. 17	s. per a	cre		N AV	1	9	3
			1.	5.	d.		
Plowing	-	-	0	3	9		
Harrowing			. 0		1 1		
Manuring		WA D	0	2	6		
Carting in ha	arvest	Hang	0	0	0 3		
1	in an an				0	6	57
Clear profit,	4l. 10s.	7d. pe	r acre		I	2	71/2
					_	-	

This produce, which is above ten quarters and one half, proves how able those lands which are well fitted for the purpose in respect of soil, are to produce large crops when properly manured. The following experiment is a very decisive one.

"EXPERIMENT V.

Culture, expence and produce of a rood in the fame field. 1765.

This rood yielded turnips broad-cast in 1764, which were manured for in the complete manner already described. In the month of March, it was plowed twice, after the turnips were eaten by sheep; again the first week in April. The second week plowed it again, and harrowed in a bushel of barley. The crop made a fine appearance. It was mown and threshed in August. The product three quarters, one peck.

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E X	PENC	ES.	1.	s.	d.
Five plowings	ing great o	pasoxa (0	1	0
Two harrowings	3.9	:	0	0	1
			-		
			_	-	

1 952				. 1	. s.	d.
Brought over	-	-		O	I	I
Seed and fowing -		-		C	2	6
Mowing and harvesting	1	-		0	0	10
Threshing		-		0	3	0
Rent, &c.		•		0		
				0	11	8
PRODU	10	E		-		
FRODE		Ľ.				
Three quarters, one peck		19	1.9	2	17	.6
Expences		•		0	ļI	8
Profit, 91. 3s. 4d. per acre		2		2	5	10
nch is gloove ten guntters ar	l.	s.	d.			
Plowing but a - wo				1		
Horrowing Dodley - Slogny	0	0	2			
Carting in harvest -	0	0	1-2	-		
n is a very elecitive one, the			sian ort	0	2	8
Clear profit, 81. 12s. 7d. per	acre		abin	2	3	1 1

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Though the season was very unfavourable to lands richly manured, yet it appears, that when the manure is rendered mild, by thoroughly incorporating, and lying for the space of a year in the earth, and yielding a large crop of turnips, it is then capable of producing large crops of corn, even in very hot seasons. The feeding the turnips off with sheep, is also a great addition to the manuring. This crop, though so large, bears with it only one year's rent; no expence of fallowing, nor any of manuring.—The profit, therefore, must be esteemed an exceeding great one."

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These were all experiments made in the old method of husbandry. I shall now proceed to give some as made in the new at different times. After which, for the sake of perspicuity (as has been already done under the article of wheat) I shall recite a few trials made upon the same soil, and at the same time in each way, with a fair comparison of the difference of profit and loss, which, upon an average, was the result of the experiment.

"EXPERIMENT I.

Culture, expences and produce of ten perches of a field, the foil a loose wood-cock loam, with a clay under it. 1764.

This piece was fallowed from the autumn of 1762, and in October, 1763, thrown into a ridge for the winter by the ninth-plowing. In March it was stirred again, and twice more in April; the last of which left it beds five feet broad; upon the crown of each were drilled two rows of barley, one foot afunder, with half a peck of feed. It came up well, and received a hand-hoeing in the middle of May; but it was not without some difficulty that. the men were prevented from burying the plants. The fecond week in June, the rows were horsehoed with a common plough, turning a furrow from the plants, throwing up a ridge in the middle of the intervals.—The idea entertained of this, was the necessity of cutting very near the rows, that the influence of the air might be exerted on the moulds in the furrow, for the rows of the corn to feed; but the execution was very hard, the corn being buried in it, in so much, that the man was obliged to go no nearer to the rows than five inches. this operation, the rows were hand-hoed again, and where the plough had not cut near enough, the earth was moved by the hoe; but in both the

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horse and the hand-hoeing, the stalks of the barley were found so very weak, that the least clod rolling against them quite buried. The first week in July, it had the second horse-hoeing, traversing the ridges, and throwing the moulds to the corn. This horse-hoeing buried some more of it. In another week, a third horse-hoeing was given it, contrary to the last; and though they did not go very near, yet in a day or two it appeared, that much of the barley was fallen into the surrows, for want of support at the root. For this reason, at the end of the month the mould was returned to the plants by the fourth horse-hoeing. Reaped it in August.—

The product one bushel. The expences and produce proportioned to neither, were as follow:

EXPENCES.

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	LVVS- I+r	in verree . f	1.	s.	d.
Twelve plowings	n-2119		0	12	0
Harrowing -	Jellie	acon best	0	0	4
Water-furrowing	- 1	iti olitwi isi	0	1	0
Drilling -	-	55719597	0	0	3
Two hand-hoeings	11/1/-	WI PRW 1	0	5	0
Seed -	it has	no and any	0	5	0
Four horse-hoeings	ולוחי	n dewelen	0	2	8
Reaping -	ota n	WINESON SIN	0	4	6
Harvesting, &c.	i diniwa	didit einela	0	I	6
		TTriny to	0	pui,	3
Made offered borrows &	(any gr		1	13	6
Rent, &c.	27/01/5			14	0
PRC		CE.	-	7	6
Two quarters, at 20s.	ans we	mon, the m	2	0	0
T	Q3			7 Plov	6 ving

the contract	them again	bent-ste	1	r.T	to 0	11:3
Plowing War	ft week in	i oe fir	8 0	lal:	edi o	OJ VD
Harrowing	or aris beby	SW-OIR C	0 4	-	ist:	riz no
Drilling diagon	Lomal ada	11000) I	1	Ji b	2005
Horse hoeing	-half-a pec	el, o and.	8	9110	1 50	uhon
Carting in harv	eft and and	ed o the	3	3		adas
A	CES.	N E 90,	K. J.	1	0	53
				-0		
Total loss	: :			2	8	41

This loss, considering the particular attention given to the conduct of the experiment, was very great.—The soil was got into fine order, the operations of hand and horse-hoeing were duly and regularly performed; and the appearance of the crop, though not any thing extraordinary, was by no means such as would indicate a loss so great.—This first trial was sufficient to give great reason for expecting that barley not being so strong in the stalk, as wheat would by no means answer so well in the drill, as in the broad-cast husbandry.

"EXPERIMENT II.

Culture, expences and produce of ten perches, the foil a light gravelly loam. 1764.

In autumn, 1762, this piece was fallowed. In April, 1764, plowed it by the tenth earth on to three feet ridges, arched them in a day or two after by the eleventh, and drilled on to the top of each a double row of barley, one foot afunder, taking half a peck of feed. Hand-hoed the rows by the end of May, and horse-hoed them the first week in June. In the middle of the same month horse-hoed them a second time, turning the moulds which before were thrown against the rows from them, forming a ridge in the middle of the intervals. In a few

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a few days after the rows were hand-hoed. In the middle of July horse-hoed them again, the contrary way to the last; and the first week in August again for the last time; hand-weeded the rows soon after. Reaped it the last week in the same month. The produce one bushel, and half a peck. The expences proportioned to the acre are as follow:

				- 0.00		
EX	PEN	CE	S.	l.	s.	d,
Eleven plowings			-	0	II	0
Harrowing	-	-		Q	0	4
Drilling -				0	0	
Seed -	- AH	e back	-	0	2	3
Two hand-hoeings	1 7.5 77	-	100	0	5	6
One hand-weeding			-	0	I	
Four horse-hoeings		-	Dile.	0	2	8
Reaping -	-		-	0	5	0
Harvesting, &c.	- 7		-	0	2	0
Threshing	•	2		0	2	3
				ל בוות	力士	
Done Sto.	98.00	_	-	s sdi	13	2
Rent, &c.		-	=	wasar	14	o
	1			28 7	(11)	2
PI	ROD	UC	E.	3	7	*
Two quarters and		3 1 1		. 2	5	0
the destrois and	.,,,,,,,,,		250/	exper	3	ale.
Loss -	-	7	agil a	Holy	2	2
		1.		d.		
Plowing -	7			6		
Harrowing	01-1112		0	41	feet	three
Drilling :				1 3 V		
Horse-hoeing -		0				
Carting in harvest	beort	0	0	3-	peq 1	half
the Alask talk and t		0011-012		in Hyp.	M ic	end o
month offe-hoed	office of	of the	alphi	9	18	112
Total los		ngaint againt	Same	bnos		mod 3
Total loss	1	ion ad	THE CO	29		

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This feems almost in every respect to confirm what was the conclusion we should be led to infer from the former experiments. Notwithstanding all the care that could be taken, yet when this grain was in the ear, much of it fell into the intervals, and was intangled in fuch a manner, as to lose much of the beauty of its appearance; though the drilled wheat, bent and inclined different ways, yet was not beaten down.

"EXPERIMENT, III.

Culture, expences and produce of ten perches as the first field. 1762.

Fallowed from the autumn of 1762, plowed it the second week in April, 1764, on to the five feet ridges, and in a few days after arched them up, and harrowed them. This made ten clean earths. The twenty-first of the same month drilled them three rows eight inches afunder, with barley on the crown of each ridge, using half a peck of seed. Hand-hoed the rows on the thirtieth of May, the fecond week in June horse-hoed them, turning a furrow from the plants banked up, and an open furrow in the middle of each interval Reaped it the twenty-fecond of August. The produce one bushel and one peck per acre. - The expences, produce, &c. per acre, as follows:

Mark its a mission and mark in and	1.	s.	d.	
Ten plowings	0	10	0	
Harrowing	0	0	4	
Drilling	0	0	3	
Seed	0	5	0	
Two hand-hoeings	0	5	0	
Four horfe-hoeings	0	2	8	
Reaping book - books - order - vis	0	5	9	

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PR	ODU	CE.			
Two quarters three b				12	6
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of refer played a			d.	2.41	T
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	days afte		AND THE SAME	22000	Ch while
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Drilling Horse-hoeing	atti sin t	OI	8	THE	and i
Carting in harvest	afunte afunter	0 0	3 3 4	NOT:	The
all a perty of ned	onius	ridge	abse]	OH	NOTO
	14, 9213 _ 11			_	
Total lofs -	an alteri	i june		12	3+
William I Lamen	C. France L.	William.			

This experiment did not turn out much better than the foregoing ones; so that drilling barley that year proved uniformly unsuccessful. In 1765, and 1766, the case was the same. In 1767, some other trials were made of the success, of which the following experiment may serve to give an idea.

"EXPERIMENT IV.

Culture, expence and produce of ten perches in the fecond field. 1767.

This piece yielded horse-hoed pease in 1766, of the white boiling fort, and in the persection of tillage and manure. The piece was marked after harvest, with an intention of trying the best method that

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that possibly could be taken to produce a great crop of barley in the horse-hoeing manner. It was plowed three times in the last autumn, the last of which turned in a load and a half of rotten farmyard dung, that had been well mixed. In the beginning of March, 1767, stirred it again, and threw it on to the five feet ridges, and foon after arched them up, harrowing in three bushels of malt-dust. Drilled four rows of barley on the crown of each ridge, eight inches afunder, using half a peck of feed. All the following wet feafon, the greatest care was taken to keep the crop free from weeds. Horfe-hoed it four times, hand-hoed it thrice, and gave it two hand-weedings. Reaped it in the middle of August. The product one bushel and Proportion and acres follows: one peck.

EXPENCES.

ococe a great in-	l.	5.	d.
Five plowings	0	5	0
Harrowing	0	0	4
Drilling	0	0	9
Seed adom - and and -	0	6	
Four horse-hoeings	0	2	8
Cost and labour of manuring, &c.	2	3	0
Three hand hoeings -	0	12	6
Two hand-weedings -	0	4	9
Reaping - washing -	0	3	0
Harvesting and vol-making the	0	2	0
Threshing	0	3	9
opportunity of extirpating thefe	4	4	0
Rent, &c 100 - 100 - 100	0	17	0
rail method.—This (with sake dilled benefit of the nobleft kind, but huch. A D U C O A Phage, the laiter	5	ii (ô
Two quarters four bushels, at 23s.	2	17	6
the the delirudian of it in fome action	2	3	6

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	1.	s.	d.	iat polici
Plowing	0	12	2 1	top of bar
Harrowing	0	0	9	hich turn
Manuring	I	2	9 2	
Drilling	0	0.	8	gaub bra
Horfe-hoeing -	0	4	0	To Smum
Carting in harvest -	0	0	51	I THE
	-	10	2	0, 10±
Total loss	311	257 2011	4	4 2

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The smallness of the crop is here (as the gentleman who made the experiment justly observes) even more amazing than the loss of money. If any crop, in the horse hoeing method, could be expected to have turned out well, surely this might, as it had so much manuring, and every other advantage which was likely to procuce a great increase. Four rows occupy a considerable space in proportion to the whole surface; consequently on the principles of the equally distant rows and broadcast methods of sowing the crop here, ought to have been very great, yet experiment proved it otherwise.

"As this year (fays my author) much refembled the last in point of weather, the wetness of the season caused the weeds to rise with unabated sury. In such a season, the drill husbandry has one great advantage, as, by means of the spaces between the rows, there is an opportunity of extirpating these hydra-headed enemies. The expence, it is true, is enormous, but then the work cannot be done in the broad-cast method.—This (with some drilled crops) is a benefit of the noblest kind; but is in barley much abated by the damage the latter operations do the crop. This year, like the preceding ones, it was found extremely difficult to prevent almost the destruction of it in some acres

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by the last horse and hand-hoeing, in every mode of drilling for the horse-hoe, the barley falls into the intervals, bending and intangling every way, in so much, that the horse cannot move without destroying much of it. This is an inconvenience which exists not a little, when the intervals are not plowed at all from the natural weakness of the stalks; but when in horse-hoeing, the plough goes pretty near the rows, as it ought always to do, if we expect benefit from the operation, the roots are fomewhat loofened, and the evil becomes much greater. This is the case generally, if it cuts nearer than five inches, and often if it goes fo near only as fix inches. Wheat, though the stalks are far weaker than those of beans, supports itself pretty well; so that the damage from horse-hoing is inconsiderable. I do not at present recollect any writer who has practifed the new husbandry that makes this complaint. Several have mentioned the agreeable foectacle which clean rows of corn present; this is true of barley while young; but when it is threefourths, or fully grown, it is the very reverse, all fprouting about, broken and intangled, exhibiting furely a much more difagreeable object than a broad-cast field, which, from its thickness, is level. The product, profit, or lofs, of any mode of

The product, profit, or loss, of any mode of husbandry, are the points that alone deserve a serious consideration. We find, from all these crops, that horse-hoeing of barley is a bad custom. We must follow the old practice here, if we expect any success; as the new is contrary to the nature of the plant, and totally unprofitable.

As to the fine state the soil is left in after a horsehoed crop; "in profitable crops (continues he) this is a most important circumstance; but nothing, when every crop is unprofitable. Of what use is all the cleaning in the world, all the tillage, manure, weeding, and labour, that can be bestowed t

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upon the foil, if it is never to repay the expence? It matters not to fay, that my land is in excellent order, if I am bound to crop it in a mode that The longer will never give a profitable crop. barley is drilled in the fame field, the greater the loss sustained, till millions are wasted. If it be faid, that a horse-hoed crop of barley is a preparation for any thing elfe, I answer, that it is far inferior to a Walk into a drilled field of barley, and behold the multitudes of weeds at harvest. I have given four horse-hoeings, three hand-hoeings, and three weedings, and yet found many weeds in the crops at harvest. With barley it is impossible to extirpate them. You cannot get into the intervals at last without destroying the crop; the weeds then fpring up, and the field, after reaping, will exhibit a very different appearance from a fummer's fal-

It is allowed, that some crops enrich and mellow the ground fo much, as to be preferable to a fallow; but this horse-hoed barley is not found to do. as it spreads about the foil, and admits the funbeams to every part of the furface. Add to this the great attention required by it; whereas a fallow requires scarcely any at all. And furely these are circumstances which must argue against the new method, with every person who seriously confiders the subject, and is capable of conviction from experiment. However, I shall add some farther comparative trials, which will put the matter beyond a doubt, as they were made upon divisions of the same land, treated in a manner as fimilar as the difference of the two modes to be compared could possibly admit of in such kind of experiments.

EXPERIMENT I.

Culture, expences and produce of twenty perches of a field, the foil a loofe wood-cock loam, with a clay beneath. 1764.

In autumn, 1762, it was plowed for the first time. It received eight earths more in the fucceed. ing fpring and fummer, the last of which threw it on to two ridges for the winter. In the middle of March, 1764, the tenth stirring was given, which threw half of it on to five feet ridges, and the other half on to common three feet ones. Plowed them again in the middle of April, arching up the first, and plowing and fowing the other; and harrowed both twice; then drilled the five feet ridges with a treble row of barley on each, eight inches afunder, using half a peck, the broad-cast a peck of seed; and water-furrowed both equally.-Hand-hoed the rows the last week in May; and the first in June horse-hoed them for the first time, turning a surrow from the rows, and throwing up a little ridge in the middle of each interval. About a week after-The end of the wards, hand-hoed them again. month, gave the fecond horse-hoeing, and handweeded the rows. The operations of cleaning, &c. were finished by the twelfth of July, by two more horse-hoeings, and one hand-hoeing. The horse work was very prejudicial to the barley, from its being much bent, broken, and entangled. They were both cut the end of August, the drills reaped, and thebroad-cast mown; and being threshed directly, the produce was:

The drilled - 0 $3\frac{1}{4}$ The broad-cast - 1 $2\frac{1}{4}$

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The proportions, per acre, were as follows:

BROAD-CAST. south

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first ceedew it dle of which other them first, owed vith a ınder, feed; d the June ırrow ge in afterf the and-&c. more horfe n its They aped, d di-

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31/2 21/2

The

Harrowing

Water-furrowing

EXPENCES. To so do rough
Eleven plowings
Harrowing - The Light begins o only
Water-furrowing ad _ manual_bas gordina6
Seed This od not say in to no
Sowing - unit dinas but _ act 1 od 3 1/6
Mowing
Harvesting, &c.
Threshing and April and Threshing and Threshing
and plowing and fowing the othe
both twice; then dulled the five free the
Rent, &c. 2 do 2 do 2 do 10 zed to wir 14 9 16
using half a pectarthe broad cast a reaching and water-furrowed both cought a Harrister
3 3 9
PRODUCE. Shi Shi 2WO1
Three quarters, one bushel, at 20s 3 2 6
Loss of The man them again. The co. slow
Plowing - o 16 6
Carting in harvest - 0 0 4 ³ / ₄
horie-hories and one Trans.
work was very projudicial to the oates.
Total lofs and -being and some short start # 53 nd -being shot Total lofs
DRILED.
EXPENCES.
Eleven plowings - leabaodind To

0 12 19

the state of the state of the state of	92.000	and. s. d.
Brought over		0 12 10
Drilling	Ref SP	The state of the s
Four horfe-hoeings -	A PARK	0 0 3
Three hand-hoeings -	- /	0 8 0
Seed		wole natole
One weeding -	S. Million	WOLE 115 119
Reaping -	100	01791-13 9
Harvesting, &c	50.4	_ O I _ 6
Threshing -	17/21/21	O I 101
		Significant
0 0 0	3.0	24147 40
Rent, &c.	-	1 14 0
		3 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
0.01		3 11 101
PRODU	CE.	Rome Sec.
One quarter and 7 bushels, a		1 17 6
0 2 2	Land and	
Loss To e Lo	of C	1 14 41
oule, at or each	l. s.	d. 10 5011
Plowing	0 16	6
Harrowing	0 0	41/2
Drilling	0 0	1 2
Horfe-hoeing -	0 1	8
Carting in harvest -	0 0	3 3 4

2 710		0 18 11 4
Total lofs		2 13 41
Loss by the broad-cast		0 18 51
Lois by the brond care	10000	
Broad-cast better by	in Fe	1 14 11
As far as this trial extends,	EL TROPICE	The state of the s

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As far as this trial extends, it is in favour of the broad-cast method of sowing. It is to be observed also, that in moist and wet soils, a barley crop is by far the most uncertain that can be cultivated, if

if the husbandry be not quite masterly and complete. Without a rich foil, the product will feldom be found to answer the expence of a fallowing. On land that is poor, and out of heart, it ought always to fucceed a fallowed crop, if the farmer looks no farther than to the barley itself for his advantage. But when the foil is in good heart, or naturally very rich, the increase will very well pay the expences of a year's fallow, for the purpose of bringing it perfectly clean; or if clover is fown with the barley, (which was the case with this broad-cast piece) it certainly answers to take every means to prepare for the crop, because a good husbandman, when a field is thrown into a regular course of crops, looks not only to one (particularly not to the first) for a recompence of his expence, but to all in course, as the fallow prepares for them all. The horse-hoed barley partakes of this circumstance, but by no means in the fame degree, as the crop of clover that remains after the broad-cast barley is gone, is a more profitable advance towards future crops, than the tillage bestowed on the barley while growing, can be expected to produce.

"EXPERIMENT II.

Culture, expences, and produce of twenty perches of a fecond field, the foil light, gravelly loam. 1764.

The preparation of this piece, as well as of the preceding, confifted of a summer and two winterfallows. It was first plowed in autumn, 1762, and six times more the spring and summer following. In March, 1764, it was once stirred, throwing one half of it on to sive feet ridges, and the other slat. The first week in April, gave it the last stirring, arching up the ridges; and harrowing

them. Drilled three rows eight inches asunder, on the top of each, using half a peck of seed: plowed the other state again, and harrowed in a peck of seed: hand-hoed the rows the first week in May; and in a few days after horse-hoed them. The operation was repeated at the end of the month, and again the second week in June. Hand-hoed it again, and weeded it the same month. The first week in July, it was horse-hoed for the last time. The last week in August, reaped it, and at the same time mowed the broad-cast. Product of the first, one bushel; of the latter, two bushels. Proportions.

DRILLED.

EXPENCES.

						I.	5.	d.
Nine plowings		-		-		0	9	0
Harrowing			4		•	0	0	4
Drilling .	•	-		-		0	0	3
Seed	•	. •		-		0	5	0
Four horse-hoe				-		0	2	8
Two hand-hoe	ings		-			0	6	3
One weeding				"		0	2	10
Reaping	-		-			0	3	9
Harvesting	-			-		0	I	3
Threshing	•					0	2	0
						1	13	4
Rent, &c.	•	•		•		1	14	0
			1			3	7	4
	PR	OD	U	CE.				
Two quarters,	at 20.	F.	-			2	0	0
Loss =		3		•		I	7	4
						_		
						_		

Plowing

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State Carrie	[24	3	17.			
awolg about the		1.	5.	d.		
Plowing =		0	13	6		
Harrowing -	90W - 110	. 0	0	41		
Drilling -		0	0	11		
Horse-hoeing		. 0	I	8		
Carting in harves	t -	0	0	3 4		-
				0	15	134
Total lofs				2	2	5 4
DD	OAD	CA	C T		۵.,	
	4 4	*				
E	XPE	NCE	S.			
Nine plowings				0	9	0
Harrowing			-	. 0	0	4
Seed -				0	10	0
Sowing	-	-		0	0	3
Mowing			-	0	1	2
Harvesting	•	-	-	0	2	6
Threshing :				0	4	0
10-0				_		
D	-1	-		I	7	3
Rent, &c.	•	=		1	14	0
				_		^
V.			*	3	I	3
	PRO	DUC	E.			
Four quarters, a	t 20s.			4	o	0
Expences		-		3	I	3
				_		-
Profit =		100		0	18	9
				-		
		1.	s.	d.		
Plowing -	-	. 0	13	6		
Harrowing	-	0	0	41		
Carting in harve	eft	- 0	0	3 3		
				-		
	R	2		0	14	24

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0 - 4

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Clear profit	er trong f			d. 6 ³ / ₄
Loss by the drilled - Profit by the broad-cast		2	5 3	$\frac{3^{\frac{3}{4}}}{6^{\frac{3}{4}}}$
Superiority of the latter	-	2	9	101

The loss here by the drilled is very great. The difference of two pounds per acre (as Mr. Young very justly observes) is an almost immense one; and especially when the land is left, under clover, in twenty times a more profitable state than after the losing crop, which appears to be the case.—The course of experiments will best evince the truth of this reasoning.

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"EXPERIMENT III.

Culture, expences, and produce of twenty perches of the first field. 1765.

In the year 1764, this piece yielded broad-cast turnips, which were managed in a common manner. They were drawn for cattle in December and January. In March, plowed it. Stirred it twice more in April, the last of which threw half of it on to five feet ridges, and half on to common three feet ones. In the beginning of May, plowed and fowed the latter with a peck of feed broad-caft, and hand hoed it three times; at the same time arched up the five ridges, and, harrowing them thrice, drilled three rows one foot afunder, on the top of each, rifing half a peck of feed. It was the fecond week of June before the corn was high enough to hand-hoe, when it was done, and horsehoed in a few days after. Before the end of the month, another horfe-hoeing, a hand-hoeing, and a hand-weeding, were given. In July, two horsehoeings

hoeings more, and another hand-hoeing. Mowed the broad-cast, and reaped the drilled, the second week in August.—Product of the first, one bushel and two pecks.—Of the second, one bushel.— Proportion, per acre, as follows:

BROAD-CAST.

EXPENCES.

		,	0,20.	. 1	. s.	d.
Four plowing	ngs		-		4	0
Three harro	winge		-	0		-
Water-furro				0	I	2
Seed	-		-	0	10	0
Sowing	-			0	0	6
Mowing	-		-	0	1	0
Harvesting,	&c.	-	-	0	I	2
Threshing	-		-	0	3	0
0				-		
				I	I	4
Rent, &c.	-	•	•	0	17	0
				. 1	18	4
				-		
	PR	ODU	CE.			
Three quarte	ers. at 2	os.	_	3	0	0
Expences	-		-	I	18	4
	,			_		
Profit	-	_	-	1	I	8
,	**			_		
			1. s.	d.		
Plowing	-	2	0 4	0	Y	
Harrowing		-	0 0	63		
Carting in ha	rveft	-	0 0	61		
				0	5	14
Clear profit	•			0	16	73
				_		
		R ₃		DR	ILLI	ED.

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DRILLED.

EXPENCES.

EAP	ENC	ED.				
The part of the second		12,741		1.	5.	d.
Four plowings -	-	111 614		0	4	0
Three harrowings	-		-	0	0	6
Water-furrowing -			-	0	1	8
Seed		-		0	5	0
Drilling -	-		1	0	0	3
Four horse-hoeings	-	-		0	2	3
Three hand-hoeings	-	-		0	8	9
One hand-weeding				0	2	0
Reaping -		-		0	3	9
Harvesting, &c.	•	-	-	0	I	0
Threshing -				0	2	0
				-		
				I	II	7
Rent, &c.		•		0	17	0
				2	8	7
PRO	DU	CE				
Two quarters, at 205				2	0	0
A Wo quaters, at 20%		ů.		_		
Loss -	2	-		0	8	7
2013	-			_		
		l.	5.	d.		
Plowing	-	0	4	0		
Harrowing -	-	0	0	$6\frac{3}{4}$		
Drilling -		0	0	3		
Horse-hoeing -	_	0	4	0		
Carting in harvest		0	0	$6\frac{1}{2}$		
Carting in harver	-	_		2		
				C	9	44
Total loss				c	-	2 1 -
1 Otal 1015				_	-/	
Profit by the broad-c	aft			0	16	$7\frac{3}{4}$
Loss by the drilled	-		-	0		
Lois by the diffied				_	-/	
Superiority of the for	mer		_	1	14	7
CHUCITOTICA OF CITO TOTAL		7 .				

the state of the periods of the state of the

Th Ha See The drilled barley is still unprofitable. This broad-cast crop is not to be reckoned a large one; but even the unprofitable crops of this kind, appear to maintain a superiority over the drilled ones.

"EXPERIMENT IV.

Culture, expences and produce of twenty perches in the fecond field. 1765.

This piece was also cropped with broad-cast turnips, managed in the common manner, in 1764, which were drawn for cattle in January and February. Plowed it in the beginning of March, and a fecond time at the end of the fame month, throwing half of it on to five feet ridges, and leaving the other half flat. It was the middle of April before the feed earth was given, when the ridges were arched up, harrowed, and drilled in three rows, eight inches afunder, with half a peck of feed, and the other plowed again flat, and a peck of feed harrowed in. The first week in June hand-hoed the rows, and in a day or two after, gave it the first horse-hoeing. During the remainder of June, and the month of July, horse-hoed it thrice more, hand-hoed it once more, and weeded it once. Reaped the middle of August. The product three pecks and three quarts. Mowed the broad-cast at the fame time. The produce, one bushel, three pecks and a half. The proportions, per acre, as follow:

BROAD-CAST.

EXPENCES.

		l. s. d.	
Three plowings	-	030	
Harrowing	2	- 0 0 6	,
Seed -	-	• 0 10 0	
	Rд	0 12 6	5

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			1.	s.	d.
Brought over	-		0		
Sowing -			0	_	3
Manuring	•		0	1	3
Harvesting			0	I	2
Threshing	: •	•	0		9
			0	19	11
Rent, &c.	•	•	0		0
			ī	16	11
			-	11111	
-]	PRODU	JCE.			
Three quarters,	6 bushels,	at 20s	3	15	0
Expences -	•	=	1	16	11
Profit -	-		1	18	1
		l. s. d	-		
Plowing -	-	0 3 0	6 <u>1</u>		
Carting in harvel	t -	0 0 (6 4		
			0	4	1 1
Cl			-		-
Clear profit	•		-		1 1 3 4
	RIL	L E D.	-		-
D I	R I L XPENO		-		-
D I			-	13	1134
D E I			-		-
D E I Three plowings Harrowing		CES.	0 0	3 0	0 6
D I E I Three plowings Harrowing Seed -		CES.	<u>i</u>	3 0 5	0 6 0
D D E D Three plowings Harrowing Seed Drilling	XPENO	CES.	0 0 0	3 0 5 0	0 6 0
D E Three plowings Harrowing Seed Drilling Four horse-hoeing	XPENO	CES.	0 0 0	3 0 5 0 2	0 6 0 3 8
D D E D Three plowings Harrowing Seed Drilling	XPENO	CES.	0 0 0	3 0 5 0	0 6 0

	L	249	J					
				-			s.	
Brought ove	r -	-		-		0	18	II
Reaping		-				0	-	9
Harvesting,	&c.	=				0		1 227
Threshing			2			0	I	10
						1	-	6
Rent, &c.	3	=	•			0	17	0
	~ ~		~ -			2	2	6
		ODU					*	
One quarter,	, 17 bus	hels, at	215.		•	İ	19	54
Lofs =	3	5		=		0	3	03/4
			1.	s.	d.			II.
Plowing	-	=	0	3	0			ing of
Harrowing	-		0	0	$6\frac{3}{4}$			
Drilling		-	0	0	3	14		
Horse-hoeing		-	0	4	o			
Carting in ha	rvest	•	0	o	61			
			=			0	8	4×
Total loss	3	=		=		0	11	5 3 4
D C. 1 1	h		_			-		
Profit by the		ait	•				-	113
Loss by the c	iriiied		Id K			0	11	53
Superiority of	f the for	mer				2	5	5 t
					200	-		

Here again the broad-cast has the preference to the other. Sowing a hundred acres with drilled barley, (as my author observes) according to the result of these experiments, he would stand a great chance of being above two hundred pounds out of pocket.

"EXPE-

"EXPERIMENT V.

Culture, expences, and produce of twenty perches of the first field. 1766.

This was intended to compare the two modes of fowing in the perfection of tillage and manuring, in order to discover which mode would pay best for an expensive culture. It had been first plowed in October, 1764, on to the ridge for winter. In March, 1765, it received the first spring plowing; the third earth was given in April, when it was twice harrowed. The first week in May, it was manured with two loads of a compost of coal-ashes, mortar, rubbish, hogs dung, &c. equally mixed. Plowed it twice more the fame month, and again in June. From thence till October, it had a plowing every month; the last of which, the tenth, threw it on to the ridge, turning in two loads of rotten farm-yard dung. In the beginning of March, 1766, plowed it again, throwing half of it on to five feet ridges, and half on to common three feet ones; and foon after arched up the first by another earth, and harrowing it fine, drilled three rows of barley, one foot afunder, on the top of each, with half a peck of feed. At the same time, harrowed in a peck of feed on the other half. Nothing could have come up more luxuriantly. The last week in April, hand hoed the rows of the drilled half, and horse-hoed them in the beginning of May, which was repeated before the expiration of that month. In June, two horse-hoeings more were given, a hand-hoeing, and a weeding; and the first week in July, another hand-weeding. Reaped in the middle of August .- Product, one bushel and one peck. Mowed the broad-cast at the same time.—Produce, four bushels and half a peck.—The proportions per acre were as follow:

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BROAD-CAST.

EXPENCES.

			1	1.	5.	d.
Twelve plowing	gs	-	•	0	12	0
Harrowing	-	-		0	0	6
Water-furrowing	ng	•	•	0	2	6
Seed -	•	-	•		12	0
Sowing	•			0	0	3
First harrowing	,	•	-	2	16	
Second ditto		-	6 200	0	8	0
Mowing	•		•	0	1	2
Harvesting	-	•	•	0	I	3
Threshing	-	:		0	8	8
a migra base and		-		5	3	0
Rent, &c.		•	2	I	14	0
				. 6	17	0
	PR	ODU	CE.			
Eight quarters	, 2 bu	shels, a	t 255	10	6	2
Expences	•			6	16	7
Profit -		•	•	3	9	8
			1. s.	d		
Plowing	•	-	1 8	9	*	
Harrowing	-		OI	1 1		
Manuring the	first	-	3 I	8		
Ditto the seco	nd	-	0 10	0		
Carting in har	vest	. 3	0 0	64		
				5	2	03
The above pro	ofit	•	-	3	9	8
Lofs	1	•	•	1	12	43
				DR	ILL	ED.

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DRILLED.

EXPEN	ICES.			
		1.	. 5.	d.
Three plowings		0		0
Harrowing -	del • in f	0	0	6
Water-furrowing -		0	3	0
Manuring		. 3	4	8
Seed -		0	-	0
Drilling -		. 0	0	31
Four horse-hoeings -		0	2	8
Two hand-hoeings -		0	6	3
Two weedings -		0	2	0
Reaping -	-	0	2	6
Harvesting, &c		0	1	3
Threshing		0	2	6
3		_		
		5	3	71
Rent, &c.	•	I	14	0
		_		
		6	17	73
PRODI	UCE.			, -
Twenty bushels, at 255.		3	2	6
1 wenty bullets, at 253.		3		
		3	15	1 1
	1. s. a	d. 3	15	1 2
Plowing -	_			
Harrowing		9		
Manuring -		8		
Drilling	-			- 4.
Horse-hoeing		3	1	- 2
Carting in harvest -		6 1		
Carting in narveit		2		
	•	-	-	
		5	5	4
Total loss -		0	0	51
Ditto by the broad-cast	Marie State	9	11	
Ditto by the broad-care	_			5

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Latter fuperior by

The manuring here was so expensive, that it is not furprifing that both these should be losing The produce of the broad-cast is so confiderable, that if we take the heart the land is left in, into the account, it may be called even advantageous. But the loss on the drilled appears so great, as to leave little hope of repaying it by future crops of barley at least. The value of this crop is but three pounds, two shillings, and fixpence, from the first vigour of the manure, and the loss above nine pounds, so that there seems no probability of the barley ever recompensing it. What a vast difference (fays my author) is that of feven hundred and forty pounds in the culture of one hundred acres of barley. Yet fuch is the difference in one year between fowing and drilling of barley.

"EXPERIMENT. VI.

Culture, expences, and produce of fifty perches of the first field. 1766.

In the autumn of 1765, ploughed a piece of horse-hoed potatoe land on to the ridge, for winter. On the twenty-first, harrowed it twice. March the twentieth, 1766, plowed it slat. The twenty-first, it was harrowed twice. April the eighteenth, plowed it on to sive parts of ten perches, in the following manner, and harrowed them twice.

No. 1. Flat, and drilled it in equally distant rows, one foot afunder, with three gallons and one

pint of feed.

2. Flat: drilled it in equally distant rows, two feet asunder, with one gallon, three quarts, and

one pint of feed.

3. Ridges, three feet afunder. Drilled one row on each; one gallon, two quarts, and half a pint of feed.

4. Six

4. Six feet ridges, double rows, one foot afunder; on each one gallon, two quarts, and half a pint of feed.

5. Flat: fowed broad-cast; with three gallons

and three quarts of feed.

June the twelfth, hand-hoed No. 1, 2, 3, and 4. The feventeenth, horse-hoed No. 3 and 4. The twenty-seventh, hand-hoed No. 2. again.—No. 1. was closed. Repeated the horse-hoeing of No. 3 and 4, the twenty-eighth. August the twenteeth, cut them. The produce,

No. 1. I Bushel, 3 pecks and an half

2. Ditto

3. 3 Pecks and 3 quarters

4. Ditto

5. 2 Bushels and 2 pecks

The proportions, per acre, were the following:

No. 1. EXPENCES.

	l.	s.	d.
Three plowings	0	3	0
Four harrowings	0	0	8
Water-furrowing	0	I	0
Six bushels and one peck of seed -	0	18	9
Drilling	0	0	6
Hand-hoeing once	0	. 5	0
Mowing -	0	I	0
Harvesting	0	2	0
Threshing _ = = =	0	5	0
	1	16	11
Rent, &c. = = =		17	0
	2	13	11

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[255] PRODUCE.

	PR	ODU	CE.	30%		
La Chinesia		ימו בחני	ika isno d		5.	d.
Three quarte	ers, 6 bu	shels, a	at 245	4	10	0
Expences	A CHARLE	in o-bi	and Alfavo	2	13	II,
Profit	7 30	· nd	on to the	1	16	I
L San Cale		L	l. s. d	<i>d</i> . –		32.00
Plowing				2 1 2		
Harrowing	and state !	A PARTY S		6		
Drilling	The state of	angige.			alore .	10
	- A	Mal Day		5 6±		
Carting in ha	irveit	-	0 0	O _∓		
its tas b	12 27 22			0	9	73
				-		
Clear profit	-		OHAC !	I	6	37
	31317 113	No. 2			1	
	-		* *	11.	1	Ma
	EXP	ENG	CES.	l.	5.	d.
Plowing	-	-		0	3	0
Harrowing			_	0	0	8
Water-furrov	ving -			0	I	0
Three bushel		ree pec	ks of feed	0	11	3
Drilling		-	1 2 7	0	0	41
Twice hand-	hoeino	-		0	8	0
Mowing	-		of the	0	1	0
Harvesting				0	I	9
Threshing			1	0	5	0
Rent, &c.				0	17	0
item, etc.				_	1/	
	D.D.	0 D T	0.5	2	9	01/2
	PK	DUC	CE.			
Three quarte	rs, one l	bushel,	at 24s.	4	10	0
Expences	-			2	9	0 t
Profit	-	2		2	0	111
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Carting in harvest + 0			
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The above profit -		0 1	
		625	
Loss -	- "	0.9	9 3
No. 5.			
EXPENCE	-c	, .	,
0	. J.	l. s.	a.
Plowing -	gn	0 3	10
Harrowing best of feed mand !	uthelp*and	9 0	18
vvaler-turrowing		J 1	O
Seven bushels and 2 pecks of fe	egniwo no	1 2	
Sowing	oeing	0 0	
Mowing -	and the second	O I	-
Threshing -		0 6	
	ing, ixc.	Ylavy.	0
6	31	1 17	47
Rent, &c		0 17	7
Elem, I.		- 1/	7
0 110		2 14	7
PRODUC			1
Five quarters, at 241. GOS		6 0	0
Expences at 24s spanegad	irer, 7 c	Aug 4a	9
Profit -	-	3 <i>5</i>	-
		3 5	5
E 1 0	. s. d.		-
Plowing 6		1	
Harrowing o	16		47
Carting in harvest - o	0 6	Bulmoi	1
	G.T.		
14 2 0		0 9	21
Clear profit	•	2 16	24

[259]

COMPARISON.

	1.	5.	d.
Profit by the broad-cast Ditto by equally distant rows 2 feet -	2	16	2 1
The former fuperior by	1	.4	94
Profit by the broad-cast By the equally distant rows 1 foot -	2	16 6	2 t 3 t
The former better by	,I	9	,1,1-
Profit by the broad-cast Loss by double rows, with 5 feet invervals	2 0	16	2 1/2 3 1/2 3 1/2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
The former better by	3	(Lab	,6
Profit by broad-cast - Loss by equally distant 3 feet -	2 0	16 12	2 ¹ / ₄ 4 ³ / ₄
The former superior by	3	8	7
Profit by equally distant 2 feet - Ditto by ditto 1 foot	T	11	5 3 =
The former better by	0	5	1 1/2
Profit by equally distant 2 feet - Loss by double rows, 5 feet intervals -	1 0	9	5 9 ³ / ₄
Superiority of the former -	2	1	2 3 4
Profit by equally distant 2 feet Loss by ditto 3 feet -	I o	II 12	5 4 3 4
Superiority of the former -	2	3	93
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Profit by equally distant 1 foot - Loss by double rows, 3 feet intervals -		s. 6 9	3 4
Superiority of the former -	1	16	1
Profit by equally distant 1 foot - Loss by ditto 3 feet	I	6	3 ³ / ₄ 4 ³ / ₄
The former superior by	1	18	81
Loss by equally distant 3 feet Ditto by double rows, 5 feet intervals	00	12	4 ³ / ₄ 9 ³ / ₄
The latter better by	0	2	7

the rest. From which we may deduce, that the old mode is better than those methods so much talked

of in fowing.

In order of profit, the next is the two feet equally distant drills; it was not generally supposed that they would exceed the common ones, yet it appeared that they did in many trials. The double rows with five feet intervals, and the equally distant three feet, are both losing crops, and nearly in the same degree; which is what might well be supposed, as they both occupy the same space of ground; but the small superiority is with the double rows, and this probably is owing to the combeing better supported, and less liable to be damaged by the horse-hoeing than single ones. It is observed, that the want of more horse-hoeing does not appear in the product of these pieces compared with former trials.

People who are fond of drawing inferences would have formed their conclusions upon the ver first or second of these experiments; but a number

of them uniformly repeated, with proper variations, is what alone can be depended upon in practical husbandry; nor can even these prove sufficient to establish any truth, if every circumstance or event is not, in some measure, attended to. A bad seafon, an unforeseen accident, may spoil the best crop in the world; all this is in the hands of Providence; and though we fow alike, we cannot be fure always to reap alike; this is not the fault of the farmer; yet where good husbandry is attended to, the returns, in general, will be such as will repay the toil and expences; and if by fuch methods, we preserve the earth, we shall certainly act prudently. All other matters can be proved only by judgment, and a long experience, both of which appear to be strongly in favour of the old method of cultivating barley.

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As to the quantity of seed necessary in the horse-hoeing culture of barley, it appears from various experiments, that about two bushels, or two and an half, are the proper proportions; and for equally distant rows of six inches, one foot eighteen inches, or two feet, three or three and an half, are generally the due quantity; though some modern authors have recommended a less proportion.

As to the time of fowing, upon the whole it is found, that in the culture of barley, the greatest care ought to be taken to sow it early; and if this grain is what he chiefly wishes should succeed in his land, in February, or in March at latest, it should be put into the ground. The success of some crops as have been sown later, are not properly to be used as arguments to the contrary, as these are most likely to be owing to other circumstances; and even these might have proved more beneficial, (if the season admitted of it) by an earlier sowing.

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Of Oats their culture, in the old Method; in the new: —Comparison between them; with various Experiments.

OUR forts of oats are reckoned to be cultivated in England; namely, the white, the black, the brown, or red, and the naked oat; though tome suppose all these to be only accidental variations, yet there are those who have observed them for several years together, without remarking any alteration when they have been separately cultivated; but say that in the colour of the grain

confifts their principal difference.

The whitest oatmeal is generally made from the white fort, and confequently where the people live mostly upon oat-bread, this is generally most artended to. But in the northern parts of England, the black oat is more commonly cultivated, which is reckoned very good food for horses. In Derbyshire, Staffordshire, and Cheshire, they raise the fed oats, but these are seldom seen near London. The straw of these oats (which are hardy and yield a good increase) is of a brownish red colour, as Well as the grain, which is thought to furnish a better kind of provender for horses, than even the fast-mentioned fort. The least common in the fouthern counties of England, is that which is called the naked oat; but this is pretty much cultivated in the northern counties, in Scotland, and in Wales, where it is prized, particularly, on account of its grain threshing clean out of the husk, and having no need to be carried to the mill, when they mean to make outmeal or grift of it.

We very often find oats fown after a crop of wheat, rye, or barley; in which case, it is com-

mon to turn the stubble with one plowing, about the beginning, and to fow the feed in broad-cast at twice, harrowing it once after the first sowing, and five or fix times after the fecond, drawing the harrow once or twice across the furrows, in order to break the clods and cover the feeds; but at the other times, to harrow in the fame direction with the furrows, left the stubble should be raised on the furface. Yet some affert, that it would be better husbandry to plow in the stubble in autumn, that it might not rot in the winter; and to give the land another plowing, and a good harrowing before the oats are fown. This (they fay) will make the ground fine, and more fit to receive the grain, the increased produce of which will more than repay the tillage. M. du Hamel, who adopts this method, gives for an instance, the example of M. d' Elu, who having given three plowings to some of his oat-lands, in 1759, a year which was very dry and unfavourable to oats, yet obtained a plentiful crop, which held up till they were quite ripe, and yielded good grain notwithstanding the drought of the feafon.

It has been observed likewise, that when oats (as frequently is the case) as sown upon a lay, or on ground newly broken up, after only one plowing, which is given in January, when the earth is most, that the sward should be turned down; the harrowing to be in the same direction with the surrows, or but very little across, lest the turf should be raised. But this again is said to be bad husbandry, because the ground would be brought to a better tilth for other grain, for which the sowing was intended, by giving the sward time to rot before the oats are sown, because the roots of the grass would prevent those of the corn from striking

downward into the earth.

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A moister soil is necessary for the black oats than for the white fort; and the latter being a more hardy plant, may be fewn earlier. The white rather delight in a drier land, and confequently will. do well on fand and gravel, and are reckoned the best of all corn for ground subject to weeds, because it may be plowed later for them, and they rife fooner, and top the weeds better than the black oats. When white oats are fown, it should be in dry weather, though the ground may be moister for them than for barley; because the thinner coat of the latter is fooner chilled by the moilture it imbibes, whereas the double husk which protects white oats; may better refift the entrance of the wet. Mr. Lise, who is of this opinion, adds, that according to his observation, the white oats require a rich foil, because their straw growing very large, cannot be supported without good juices, that white, chalky ground, will prove unfuccessful with white oats, and that even a mixed mould, between white earth and red clay, is not rich enough for feeding them; though the red and the white clays, when in good heart, frequently prove very fuitable.

The white oats are generally reckoned to produce a greater increase than the black ones. Mr. Liste thrashed a stack of twenty-eight loads of the former, which yielded (as he says) more grain than a stack of thirty-eight loads of the latter; and an ordinary crop of white oats has often been found equal to a middling crop of black oats. Besides, it is added, that the last fort is most liable to blights, and particularly when a dry, cold spring, is succeeded by a hot summer, and the grain has been sown in a lay ground.—The culture, manner of mowing, and ordering them at harvest, is the same, only that black oats are apt to shed most as they stand, but the white ones as they lie, which

cannot be confidered as any very material difference.

In the beginning of May, in the year 1709, Mr. Liste sowed in some of his wheaten ground, where the corn had been destroyed by the sharpness of the preceding winter, rath-ripe barley in one part, and short-grained white oats, which he distinguishes by the name of white Poland oats, in another. Both were fown on the same day, in an equally fertile, moift, and well-tilled ground. He thought the Poland oats would first be ripe, and was surprised when he faw the rath-ripe barley fpring up the foonest by four or five days; but when he reflected on the nature of each grain, he concluded the reafon was, that the oats having a double hull, and being consequently better guarded from moisture, could not imbibe the vegetable water fo foon as the barley; but that the texture of the flour of the oats, and the infolded fibres of the inclosed plant being softer, it would consequently grow faster. From hence he inferred, that to fecure the growing of the Poland oats without rain, they must be put into the earth before it becomes so dry as is proper for barley; not only because the oats require more moisture to make them grow, but also because they lie so many days longer in the ground than barley before they come up.

Those husbandmen who understand the culture of oats, when they are about four inches high, run a wooden roller over them, after a shower of rain has softened the clods; by the breaking of which in this manner, fresh earth is laid to the roots of the plants, their tillering is considerably increased, if they have not been sown too thick, and the surface of the earth is smoothed, so that the mowers at harvest are able to cut close to the plants, as they generally are ordered to do, because oats sel-

dom

dom grow high. Great care should be taken in

weeding both of oats and barley.

When the straw, of oats, turn yellow, they are accounted ripe if the chaff opens, and begins to shew the feed. When they are mowed, it is the custom to suffer them to lie some time for the dew and rain to plump them, and make them thresh well, and, if weedy, to destroy the weeds; but if rain should wet them much, they should be carried off as foon as they can be got tolerably dry again, left they should shed, for oats are mostly got in the wettest of all corn, provided the weeds amongst them lie dead. Even in those rainy harvests which generally spoil other corn, this grain receives little or no damage, the furface of its straw and ears being to smooth and compact as to turn off water, and of so dry a nature, that though housed wet, they neither become mouldy, nor heat in the mow, as other corn is apt to do.

It is the opinion of M. du Hamel, that farmers who keep many cattle would find their account in housing their oats directly, without letting them lie out after they are cut, which is the common method, that rain and dew may moisten and swell the grain. He advises husbandmen, at least, to try the experiment upon a part of their crop. Because (says he) the fodder will thus certainly become much better for cattle, and much less grain lost in the field. It may be objected (continues that gentleman) that these oats will be difficult to thresh; to which I answer, That if this be the only inconvenience, the superior quality of the fodder, and the sowing of a quantity of grain which would otherwise be shed, will, probably, more than pay the extraordinary wages of the

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"But, allowing that the oats thus housed cannot be threshed quite clean, but that some grain

will necessarily remain in the ears, this will not be loft to the farmer; for he is obliged to give his cattle unthreshed oats, and they will easily find the grains remaining in the straw, which will not perhaps, exceed the quantity that would have dropped in the field; and even granting, though it will not happen, that the greatest part of the grain remain in the ear, yer it will not be lost to a padiclous farmer; for what should hinder him from giving it to his horses? Supposing four sheaves to yield a bushel of oars, he needs then only to give his horses those sheaves instead of a bushel of corn. They will certainly be longer feeding upon four sheaves than upon a bushel of cleaned oats. and will, at the same time, eat some straw with the corn, which will supply the place of other fodder, and probably prove a more healthy food."-The method here mentioned, is recommended chiefly to those who live in very hot countries, or to be practifed in very dry feafons.

The opinion that oats cut green will ripen while they are in swarth, Mr. Liste has taken some pains to refute in the following manner. - " If by ripening (fays he) be meant shrinking, drying, or withering, I must allow the position; but if the countryman believes, that the greenish oat, cut a fortnight, ten days, or even a week before it is ripe, will proceed in its vegetative increase, and fwell as well as harden by lying in swarth, I must This year (meaning the year 1707) I deny it. made a full experiment of the matter; for when the fpring-corn was fown, the ground being generally dry, half the oats and barley did not come up till the latter end of May, when rain came; whereby, in most places, half the crop was edgegrown. The forward oats being then in danger of shedding, we were forced to cut down the greenish corn with the ripe, when otherwise we should have

waited

waited ten days longer. I let them lie in swarth above a week, and when I carted them, I found the hull of the greenish oat had got a riper colour; and the pith was well hardened, but very lean and much shrunk; so that though this is to be done through necessity, yet it ought not to be practised with such indifference as is usual among farmers. It is to be observed, that the pith of these green oats was well past the milk, and come to a floury substance."

It is added by the same gentleman, that oats are the worst of all grain to keep, on account of the great moisture in them; and even says, that they are very liable to heat in the mow; a circumstance which others have seldom observed to happen. "When this heat (says he) has been such as to spoil them from growing, their hulls look as red

as a fox."

In a dry summer, some years ago, we are informed, that the drought proved the means of discovering a profitable use that might be made of oats, on such occasions, and which, probably, would likewise answer in the winter. It was this: Some milkmen, near London, boiled oatmeal in the water which they gave their cows to drink; and the consequence was, that the expence was abundantly repaid by the additional quantity of milk which those cows yielded more than such as had not this mash, which proved equally profitable and wholesome.

It is well known, that oatmeal makes a bread that many esteem extremely nourishing, and which is the chief support of the poor in Scotland, and in some of the northern counties of England; though it is certain, that this meal is of so heating a nature, as to produce cutaneous disorders, and some other diseases, where so much of it is daily used.—Beer is made in some places of this grain;

in Russia, in particular, the lower class of people extract a drink from it. But its principal use is for the fodder of horses, for which purpose it is reck-oned very wholesome, being sweet, and of an opening nature; yet it is advised not to give it them before it has been sweated in the mow, or otherwise dried, lest it should prove too laxative for them.

How far the breed of this noble animal ought to be encouraged, this is not a proper place to discuss.—The horse is undoubtedly extremely useful, yet when appropriated to the uses of luxury, there is no doubt but that they may prove a nuisance. However, as a quantity of oats must always be raised, to feed such a number of horses as being absolutely necessary, do not come under that predicament, it is certain that this grain will be useful for their support, and, on that account, will always be found to form a considerable part of the farmer's crop.

I shall here subjoin, as usual, some experiments made upon oats both in the old method and the new, with the comparison between them; but the recital of these under this and the following heads, will by no means be so much extended as those upon wheat and barley, the culture of the former being allowed, on all hands, to be of more importance.

"EXPERIMENT I.

Culture, expences and produce of four acres and an half of a field of a light, gravelly foil. 1763.

In 1759, this field was cropped with barley; in 1760, with peafe; in 1761, turnips; and barley again in 1762.

EX	PEN	CES	VI. 12	1.	5.	d.
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Two harrowings	100			0	I	0
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				0	5	6

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ar, the lower clafs of people	Traines	1. s. d.
Brought over	ti pr ė	
Seed and apparation deliler in	a de la	1 16 0
Sowing		0 2 3
Mowing -	27.0	0 5 3
Harvesting -	or mount.	0 12 0
Threshing -	icial f	0.18.0
at there there shad side to		3 19 0
Rent, &c.	o of other	13.16 6
Leo the urise to hexapp, there they may prove a neutinate.		7 15 6
PRODU	CE.	es Javanoli es os pesis
Eighteen quarters -		
Expences -	≠ 87180-61	7 15 6
Profit, 11. 9s. 5d. per acre		6 12 6
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Plowing disa- its wi- at A	0 6	mide pure
Harrowing	0 2	13/11/2 2/9/1
Carting in harvest	OI	do la la la la la la la la la la la la la
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ley, the culture of the forms		
Profit, 11. 7s. 01d. per acre		6 1 81
The state of the s	41	-29

In the foil where this feed was fown, four quarters, per acre, was reckened a very good crop, and not usual for a second. Though some suppose, that nothing is gained by taking two crops without an intervening fallow; this, as well as some other experiments, argue in favour of the contrary opinion.

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"EXPERIMENT II.

Culture, expences and produce of three acres of a fecond field, of a-loofe, woodcock loam, amindifferent pasture land. 1764.

In 1759, this field was cropped with barley; in 1760, oats; in 1761, clover; in 1762, wheat;

in 1763, turnips.

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The land had but one plowing after the turnips (for which crop part of it was dunged, fifteen loads per acre) throwing it into arched fleatches; and fowed the white oats on the twenty-eighth of April.

EXPENCES on sell bear

ri as w best of the lands and grown	
	1. s. d.
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Plowing	0 3 0
Harrowing 7 14 M L M H 4 M	0 1 0
Mowing and harvefting	0 6 0
Water-furrowing	10 131 6
Threshing	0 18 0
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Eight quarters, at 9s. 10-4	1/05 118 110
Expences the recorded bearing the grands of the confer amount the confer amount the confer amount to the confer amount t	5 5 6
ember, amblishing in the livaw to ten	
Profit, 10d. per acre	0 2 6
EXPENCES.	,
	Plowing 3
Plowing - 0 4	3
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- MA	

It is good husbandry for a crop of spring corn to follow one of turnips.—These latter were well hoed, and part of them dunged, as above-mentioned, yet there was only a return of the poor crop of two quarters per acre. The land being flat, the excess of wet is supposed to have washed away all the virtue of the dung, and greatly damaged the crop. Clover was sown also at the time of sowing the corn; but whether the seed was bad in itself, the soil, after carrying off the oats, was left in a wretched condition.

"EXPERIMENT III.

Culture, expences and produce of ten acres of a third field, the foil fimilar to the last-mentioned.

On the 8th of November, 1764, the barley-stubble was turned up. The greatest part of the field was hollow-drained during that winter. On the twenty-ninth of April, 1765, it received the first spring-plowing. Harrowed it, May the third. Between the seventh and eleventh, plowed, sowed, and harrowed it. August the twenty-second, they were mowed, and carried between the second and fifth of September, amounting in the straw to ten loads.

I	EXPEN	CES.	1. s. d.
Plowing -	.1		I 10 . 0
Harrowing		-	0 5 0
Rolling	0 7,	Saviad	0 2 0
			1 17 0

to

	C 4/2				
A		4	1.	s.	d.
Brought over			1	17	0
Seed, 5 quarters a	nd 4 buff	iels, at 15	5. 4	2	6
Water-furrowing		•	0	10	0
Harvesting	•	-	I	10	9
Threshing 30 quar	ters, 7 bi	ishels -	1	13	0
			9	13	3
Rent, &c.		•	8	10	0
•			18	3	3
P	RODU	ICE.			100
			-6		6
Thirty quarters, 7	buineis,	at 1/3			6
Expences -			17	3	3
Profit, 18s. 1d. pe	er acre	•	9	1	3
		1. s.	d		74.
Plowing -		1 10	0		
Harrowing -		0 3	9		
Rolling -	1 2	0 0	5	1	
Carting in harvest	•	0 5	5	. ,	
			1	19	7
			_		

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"EXPERIMENT IV.

Culture, expences and produce of eight acres of a fourth field; the foil a loam, not so good as the former. 1765.

The grass field was so extremely laid, that it was thought necessary to break it up with intention to lay it down again. The plowing was begun on the eighth of February, and finished by the twenty-

fifth of April. The ninth and tenth, fowed five acres of it with two quarters of the finest white Poland oats, and the other three acres with one quarter of the black fort. Harrowed them in twice with a heavy pair of harrows, afterwards with a lighter pair, and lastly with a gateful of short bushes, which left it very fine and level. The frosts that succeeded the breaking-up, mouldered the turf, which proved of great advantage. The black bore much the best appearance, from the time of sprouting to harvest. Mowed the white, August the twenty-fifth. September the second, carried them. Mowed the black the tenth. The sifteenth, carried them.

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Product of the la		3000	q. 4 3	b. 2 2	The b	
			7	4		
Of the former The best	q.	b. 2				
Screenings	3	6	10	0		
Total ,			17	4		
E	XР	EN	CES			
					1. s.	d.
One clean earth			-		0 16	0
Harrowing	_		-		0 10	0
Rolling	-		-		OI	0
Cood					0 17	^

Secu	2	1/	U
Water-furrowing -	0	3	0
Mowing -	0	9	4
Harvesting	0	13	. 0
Threshing -	1	6	3
	6	15	7
Rent, &c.		16	0
	13	II	7

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PRODUCE.

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and the same of th	· Wi	1. %		1.	s.	d.
Ten quarters, 4 bushels, at 1			- 4	8	0	0
Seven quarters of screenings,	at	105.	· .	3	10	0
	fi	16	(B. 1)	1 1	.10	0
Loss, 5s. 2d. per acre				2	Í	7
	l.	s.	d.		ui de	
Plowing	I	18	4			
Harrowing	*	4			37/01	
Rolling	0	0	4	913		
Carting in harvest -	0	4	4			
	16			3	7	0
Total loss, 13s. 63d. per acre				5	8	7

The above experiment may be deemed an important one; first, as it indicates that the great immediate profit of breaking up old laid grass lands is in some respects imaginary, owing to a want of due pulverization, since how rich soever the turst may be, it is little like to yield much nourishment till the parts are more broken than a single plowing can leave them. Whatever the profit of this method may be, the farmer should be warned that it is not immediate, as commonly imagined, so that he may avoid a dependence on a quicker return than he will be likely to receive. The wetness of the season, at this time, was rather an advantage, to the black oats at least.

In the next place, the comparison may be here made with accuracy, between sowing new plowed land with the two forts of oats, in proving by a superiority of one fourth of the produce, that the

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though some of those who were esteemed judges had foretold, that the white oats would yield the best crop. This experiment proves the contrary; though in different, and, perhaps, lighter soils, it may happen otherwise.

"EXPERIMENT V.

Culture, expences and produce of a rood of a field, the foil a loofe woodcock loam, and under that a clay. 1767.

In 1766 this rood yielded cabbages in complete culture. These were cut for cattle in the winter, and the land plowed thrice by the end of April, when it was sown with six pecks of white oats. They slourished well through the whole season, and were cut in August. Produce three quarters, two bushels, and one peck.

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EXPENCES.

•					
Lawrence rooms			1.	5.	d.
Three plowings			 0	0	9
Harrowing	•	Contract to	 0	0	01
Seed and fowing		restrict to	0	3	54
Water-furrowin			0	1	3
Mowing and ha	rvesting	• ' •	0	0	3
Threshing	•		0	3	34
			0	9	0:
Rent	- (A. *)	•	0	4	3
•	1		0	13	31
	PROD	UCE.			
Three quarters,	2 bushels,	1 peck	2	19	7:
Expences		•	0	13	31
			2	6	4

The state of the s	1.	3.	d.
Plowing	0	7	34
Harrowing -	0	0	1
Carting in harvest	0	0	11
			4.

Clear Profit, 71. 15s. 3d. per acre - 1 18 93

So large a crop of oats has feldom, if ever, been produced by the common management, and here we find, that the very ample manuring of one crop, answers extremely well for those which succeed it.

In the course of these and other experiments it appears, that no crop is of such an inferior nature, as not to pay well for being sown upon land that is in great heart. Oats are, however, too generally looked upon by farmers as so rank seeders, that any land will do for them, and not requiring any great attention, so that we seldom find more than one earth bestowed upon them, which is a very

bad practice.

7:3:

" The good culture of oats (fays Mr. Young) is, by a course of experiments, strongly contrasted to the common management. In the latter, the fum of forty shillings per acre is expended, to produce a profit that is scarcely equal to the interest of the money. In the improved culture, near three times that fum is indeed expended, but not merely to produce three times the profit; but a profit of 41. os 10d. per acre, besides the amazing difference of the foil, being in one case utterly exhausted, and in the other so greatly in heart, as to yield a certainty of good crops in future. This comparison is so decisive, that it ought to convince the farmer, that the only way of gaining much profit by the culture of oats, is never to fow them but when the land is in great heart, or in other words, not to

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EXPENCES.

Three plowings -	. •	0	0	9
Harrowing -	•	0	0	0
Seed and fowing		0	3	5
Water-furrowing -	•	0	1	3
Mowing and harvesting -		0	0	. 3
Threshing	•	0	3	34
		0	9	0;
Rent -		0	4	3
•		0	13	3 =
PRODUCE	ś.			
Three quarters, 2 bushels, 1 pecl	ζ -	2	19	7:
Expences -		0	13	3:
		-	6	1

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make a distinction between wheat, barley, and oats,

respecting preparation.

" The height (adds he) to which this good culture has carried the produce of oats, is in comparison with the husbandry of common farmers, very furprizing. It is one among the many proofs which a little experience is fufficient to give, that the general ideas of the product of grain are very false; our common notions of great crops are merely relative to bad husbandry, or at least not the best; and what makes the acquisition of the knowledge of the truth particularly important is, that these great products are the effects, not of new modes of fowing, dependant on gim-crack inftruments, nor of any fine system of conduct, fit only for the dreams of philosophers; but, on the contrary, are gained by common practice alone, improved in degree. Every article of this improved management is common; the perfection confifts in nothing but the quantity of common means. If it be asked, why all farmers do not cultivate their land with this spirit, I answer, it is because they have generally more land than they can manage.— This culture is at first three times as expensive as the common, consequently the stocking of a farm thus managed, would be three times as great as the fums at present applied. Now a farmer with much money (according to the common notion) or a little farm would think himself ruined, and so he undoubtedly would be, unless his money were judiciously expended in the increase of product. All of them are eager for large tracks of land, fo that the very idea, in that case, of such an extensive culture is rendered impossible. It cannot however be doubted, but that a small farm, managed in this compleat manner, would be much more profitable than a large one under the common culture,"-And the

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the proof of this affertion is referred to the cer-

tainty of experiment.

In the new mode of culture, I shall next give an experiment or two; but in the process of this work, there will be less occasion to multiply them, not only as many of the subjects are not of so high importance as the former ones, but also as they mostly tend to establish the like truths, with the series of them which have been made upon the same occasion.

"EXPERIMENT I.

Culture, expence and produce of a rood in a field, the foil a light woodcock loam. 1765.

In autumn, 1763, this rood was plowed on to the ridge for winter. In the spring it was stirred twice more, and harrowed twice to render it fine, that the weeds might grow plentifully. The effect was answerable; for, in the beginning of June, another earth was given, which turned in a full crop of them. The fixth earth was given in July; three more at the end of September, the last of which again threw it on to the ridge for winter. In March, plowed it on to the five feet ridges, and foon after arched them up, and harrowed them. Drilled three rows of oats on the top of each, one inch afunder, taking three pecks of feed. the middle of May, the first horse-hoeing was given, and in a few days after hand-hoed them. beginning of June, gave the second horse-hoeing, and the end of the same month, both hand-hoed and weeded the rows. On the first of July, horsehoed them the third time; and repeated the operation for the last time about a fortnight after.— Reaped them the last week in August. Produce one bushel.

[280]			
EXPENCES.	1.	s.	d.
Eleven plowings	0	2	9
Harrowing locality vib - wall -	0	0	í
Water-furrowing	0	0	6
Drilling II TWIMIS	. 0	0	03
Seed	0	I	6
Two hand-hoeings	0	I	6
Four horse-hoeings	0	0	8
Two weedings	0	0	71
Reaping	0	1	0
Harvesting, &c.	. 0	0	4
Threshing as over tool -	. 0	0	1 1
ster y helt was not tlone till the be-	-	02.5	
report in Expense themed again on the	0	9	13
Rent, &c.xd-vin was add.	0	8	6
The west in them should double for			••••
streads alunder, with four feet in-	0	17	74
and and sind PRODUCE.			
One bufhel	0	2	0
Los bedeat Reavel as a local	Carl T		-1
THOUGHT MINOR STATE DOLLING TO HELD THE	d.	15	14
AC AND DEED THE SHEET IN THE STATE OF			Jak
	9		
Drilling 0 0	03		
Horse-hoeing o I	0		
0	11		
Carting in harveit - 0 0	+1	Mar.	07/
0 8 0	P	4	0-1
O Fr O Programme Total In	E BUDIU	H II	
Total loss, 31. 18s. 4d. per acre	0	19	7
0 11 0			K

This experiment certainly proves how unfit the drill culture is for oats. It is nearly the same with this grain as with barley, the stalks sprouting about the intervals prevent the horse-hoeing, or render it improper, on account of the damage it does .-

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Heavy rains must generally be supposed to beat them down still more. But they fell of themselves this time, though it was a dry season.

"EXPERIMENT II.

Culture, expences and produce of seven acres of a field of an indifferent kind of a loam.

This was fallow in the year 1761. In 1762, wheat; 1763, barley; 1764, fallow; 1765, wheat.

The wheat stubble was plowed up on the twenty-eighth of October, except about two acres and a half in the middle, which was not done till the beginning of December. It was stirred again on the twenty-third of April. The twenty-sixth plowed it again, and harrowed it, then struck double surrows, eighteen inches asunder, with four feet intervals, and sowed seven bushels of white oats in them, going once over with the harrows, to cover the seed. Horse-hoed sour times, after which cabbages were planted in the intervals. Reaped them Septemb er twenty-third. Carried the tenth.—Product sive quarters, three of the best, and two of screenings.

EXPENCES.

			1.	5.	d.
Three plowings		•	I	1	0
Two harrowings			0	3	0
Striking furrows	1.		0	3	0
Seven bushels of seed		•	0	14	0
Sowing -	-		0	2	6
Horse-hoeing			0	II	6
Hand-hoeing -		•	0	12	6
Reaping 3s. 3d.	-		I	2	9
A deep water-furrow the field, and mak					
times -		•	0	12	0
mental at the second			-	-	-
****			5	2	3

	5 0 0 5 5	-	d. 3 9 4
	5 5	8 8	9 4
	5 5	8	9 4
	5 5	19	4
	5	-	
	5	-	
	_	19	0
i i i i			
	11	18	4
E.			A 10
-	2	14	0
		1	0
	_		_
	3	13	0
	8	5	4
1. s.	d.	9.	
2 10	3 3		
0 5	- /		
	9		
0 3	91		
	5	3	14
	13	8	54
	l. s. 2 10 0 5 2 3	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$

This land, for a fecond crop, was well prepared, and the horse-hoeings effectually performed, and yet a greater loss was sustained than by a common crop of oats or barley, a circumstance very unfavourable to the new husbandry.

"EXPERIMENT III.

Culture, expences and produce of a field of a woodcock loam. 1766.

This piece yielded horse-hoed turnips in the year 1765, which left the soil in very good order.

H

In the beginning of March, traversed the ridges, (five seet ones) and arched them up by two plowings, drilling three rows of white oats on the top of each, using six pecks of seed, the rows one foot from each other. May seventeenth, hand-hoed them, the end of March being very wet. In June horse-hoed them three times. Hand-hoed them once, and weeded them once. July eleventh, horse-hoed them for the last time. On the nine-teenth, hand-hoed them again. Reaped the twentieth of August. Produce two bushels.

EXPENCES.

						1. 5	. d.
Two plowing	zs	-		-	0	0	6
Harrowing	-			-	0	0	4
Drilling				1	0	0	04
Seed -		-			0	2	0
Four horse-h	oeings			-	0	0	8
Two hand-he		-		-	. 0	WOL	SET.
Two hand-we	eedings			_	0	0	6
Harvesting,	Szc.				0	0	4
Threshing	_		_		0	0	5
1							3
					0	6	6:
Rent	•			•	0	4	3
		A STATE	du i		0	10	91
	PR	ODI	UC	E.	- Dok m		arus
Two bushels	1-4-03	- Olivair	A LONG		0	4	0
Loss -				DECK!	0	6	9:
			1.	s.	d		
Plowing		0 3 5	0	1	2 1		
Harrowing		ment	0	0	2		
Drilling			0	0	03	24-5	
		131 - 45 7	110		1100	- 1 - 1	
					0	1	57

58 310 575 H	1	l.	5.	d.
Brought over -		0	1	54
Horse-hoeing		0	1	0
Carting in harvest	•	0	0	1 2

0 2 6

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Total loss 11. 175 6d. per acre - 0 9 41

This experiment furnishes another proof of the impropriety of the horse-hoeing culture for oats, and it had in every respect fair play; yet the weakness of the stalks (though they support themselves better than those of barley) occasioned a damage, without an increase of luxuriance in the crop to repay it.

"EXPERIMENT IV.

Culture, expences and produce of a rood in a field, the foil a loofe woodcock loam. 1767.

In 1766, this piece yielded horse-hoed turnips, in the perfection of culture. It was marked for oats in particular, in order to use every endeavour to get a good horse-hoed crop of this grain. The turnips were drawn in November, and the ridges (five feet ones) reverfed, by a plowing given directly afterwards. A load and half of rotten farmyard dung was spread over it, and turned in by a fecond earth, which at the same time arched up the ridges, and laid them dry for the winter. In the beginning of March, stirred it again, reversing the ridges, and foon after harrowed in three bushels of malt dust. Arched them again by another plowing, and drilled three rows of white oats on the crown of each, using a peck and a half of feed. It was kept free from weeds throughout the fallowing feaion. It was horse-hoed four times, hand-hoed thrice, and hand-weeded twice. Reaped in the middle of August. The produce one bushel and three

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three pecks. The proportions per acre are as follow.

follow.							11191	
]	EXP	ENC	ES	S.		50	ri-et	iold
						7.	3.	d.
Four plowings			-			0	4	0
Harrowing	-		-			0	0	4
Drilling		•		-		0	0	3=
Seed	-,	•		-		0	II	6
Water-furrowi	ng	-	-			0	0	6
Cost and labou		nanuring		-		2	3	0
Four horse-hoe		W		-			2	
Three hand-ho				-			12	
Two hand-week	dings	-		-		0	4	9
Reaping	-	•		-			3	
Harvesting, &c		•	-				2	W Sa
Threshing			-			0	4	8
						-	20117	Fried
						4	9	2 1
Rent -		•		-		0	17	0
						-		-
						5	6	21
	DD	ODU	CI			19	s 19	201
A Section of the sect						346		i i i i i
Three quarters	and fo	our bush	els a	t 18	35.	3	3	
Loss			-		4	2	3	2 1
			1.	s.	d.		how	
Plowing	_		0	9	9			alaka.
Harrowing			0	0	9			osii
Manuring	-		I	2	-	13		North Control
Drilling -			0	0	3	- 1		in
Horfe-hoeing	•		0	4	0			bae
Carting in harv	rest		0	0	6	1		1
	Phon	*15/11/32				-	117	Bi
	* - 4			110	11.	I.	18	03
Total -		-		•		4	1	34
					., .	-	T	hus,
								,

Thus, upon the whole, we find, that the culture of oats in this method is highly unprofitable. The avarages of these expences being drawn, will form the best comment.

F	X	P	F.	N	C	F	S	
1	1	1	_	7.4			U.	

Experiment I. per acre II III	:	4 2	5. 6 8 13	4 9‡
to entaining points of the entaining of		9	8	7=

l. s. d.
Average - 3 2 10⁴

PRODUCE.

no stao - militar on				b.	
Experiment I.	-	•	0	4	0
II.		-	0	5	2
oda boot a III.	-		I	0	0
signar a few days			2	-	2
Tree Delication			2	I	2

Average - - 0 5 3

L O S S.

Experiment I.	feel . The			18	
II.		•		18	
III.	•	•	1	17	6
			-		
	100 + 1	T. C. Fla	7	14	2

Average - - 2 11 4

Such is the disadvantage, according to these experiments; and it appears plain, that such disadvantages always will attend the culture of oats, according to the new husbandry.

I shall

I shall next present the reader with an equal comparison between the old and the new methods of culture, with which I shall conclude this chapter.

COMPARISON. "EXPERIMENT I.

Culture, expences and produce of twenty perches of a field, of a light gravelly loam. 1765.

In 1764, this piece of land yielded horse-hoed turnips. They were drawn for the use of cattle in December and January. In the beginning of March plowed for the first time. The first fortnight in April, stirred it twice more; the last of which left half of it arched up in five feet ridges, and the other half on common three feet ones. Drilled the first with three rows of white oats on the top of each, using a peck of seed, and at the fame time fowed the other with a peck and a quar-The fecond week in June, hand-hoed the rows, and gave the first horse-hoeing a few days after. Another hand-hoeing and weeding were given before the end of the month. In July two horse-hoeings more, and another hand-hoeing. Mowed the broad-cast, and reaped the drills the last week in August.-The product of the first fix pecks of the latter, a peck and a half. The proportions per acre as follow.

BROAD-CAST.

EXPENCES.

Three pl	owings			-	<i>l</i> .	s. 2	d.
Harrowi	ng -		-		 0	0	4
Water-fu	irrowing		-	* de .		0	6
Seed	. 7	-,			0	12	0
					-	90	

0 15 10

	1 .		-					
						1.	5.	d.
Brought over	-			•		0	15	10
Sowing -						0	0	3
Mowing -		•		-		0	. 1	_
Harvesting				-		0	I	2
Threshing -		•		•		0	3	. 0
1						I	I	3
Rent, &c.	-			•		0	17	0
						1	18	3
P	R O	DU	C	E.				
Three quarters at	175.					2	11	0
Expences -		-		•		1	18	3
Profit -		-	,			0	12	9
Dlowing				s.				
Plowing - Harrowing -		-	0	3	4			
Carting in harvest		-	0		6:			
			-			0	3	IOT
						_		
Clear profit -		-		•		0	8	101
D R	. 1	L	LI	EI).			
E	X P	EN	CE	S.				
Three plowings	-	-		-		0	3	O
Harrowing -		-		-		0	0	4
Water-furrowing	•					0	0	6
Seed -	•	•	-			0	4	0
Drilling -		-		-		0	0	3
Four horse-hoeings	3.			-		0	2	
Three hand-hoeing	gs	-		-		0	8	9
One hand-weeding		-		•		0	2	0
						1	1	6

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	21/2						
Brought over	mere de la	Maria)	1	-		· .	d. 6
Reaping .				-	48 20 20	1	
Harvesting		1				3	400
Threshing	D C.				1 (3)		9
1 meming	The state of	71			Bur	0	9
7.					I	7	0
Rent, &c.					0		0
							1
					2	4	0
	PRO	DU	CI	E.			
Six bushels at				-	0	12	9.
			- 1		-		
Loss -		. ,	# 1		1	11	3
			1.	s.	d	Se miles	-
Plowing	-		0	3	0		
Harrowing	-		0	0	4	11)	303
Drilling -		-	0	0	3		
Horse-hoeing	-	-	0	4	0		119
Carting in har	vest	-	0	0	61		
A STATE OF THE STA			-		-	34	
					0	8	13
Total loss	-	-		-	1	19	41
					-		
Profit by the b			•	-	. 0	8	13
Loss by the dr	illed			•	1	19	4=
					2		
Superiority of	the forme	er	-		2	8	3
					-		-

The balance of these accounts (though the profit by the best mode is but little) is well worth the farmer's serious attention.

"EXPERIMENT II.

6

Culture, expences and produce of half a rood of the fame field. 1766.

This piece yielded potatoes in 1765, which were taken up in October, and the land plowed on to

The fineness of the weather the ridge for winter. in the beginning of March left room to give it two earths, and to get the feed in by the twelfth, one half on five feet ridges was drilled in treble rows, at one foot, taking half a peck of feed, and the other horse-hoed in the broad-cast manner with a peck and a half. Hand-hoed the rows May feventeenth; but nothing more could be done that month, on account of the wetness of the weather. In June horse-hoed them twice, and weeded them once. July the fourteenth, gave the last horsehoeing, and foon after hand-weeded the rows again. Cut both on the twentieth of August. Produce of the broad-cast one bushel and half a peck; of the drilled two pecks. The proportion, per acre, as follows:

BROAD-CAST. EXPENCES.

EXTENCES	l.	s.	d.
Three plowings	0	3	0
Harrowing	0	0	4
Seed	0	13	6
Sowing	0	0	3
Mowing	0	I	0
Harvesting, &c	0	2	0
Threshing -	0	3	0
	I	3	1
Rent, &c.	0	17	0
	2	0	I
PRODUCE.			
Two quarters two bushels, at 18s.	2	0	6
Expences	2	0	1
Profit	0	o Plow	5 ving

Ple Ha Dr Ho Car

Plowing - Harrowing - Carting in harvest	- T	l. 0	s. 7 0 0	d. 2 9 6½		51
The above profit Loss -				0		5 1 0
	RIL	LE	D.	1 1 2		121/1
E	XPEN	CE	S.			
Three plowings	Jai e			0		0
Harrowing - Seed -	1		14	0		6
Drilling -	1	-		0	0	31
Four horse-hoeing Two hand-hoeings			hen:	0	1 - 1 - 1 - 3 1	8
Two weedings	-		. Obs	0		3
Reaping -			10	0	2	4
Harvesting, &c. Threshing				0	0	9
Rent, &c		-		1 0	4 17	3 0
P	ROD	UCI	Ξ.	2	1	3
One quarter			•	0	18	0
Lofs* -		1.	- s.	1 d	3	2 3
Plowing - Harrowing - Drilling - Horse-hoeing - Carting in harvest		0 0 0	7 0 0 4 0	2 1/4 9 3 0 6	12 T	8‡ otal

5 ng

Total loss Loss by the broad-cast	I	15	d. 11 1/2 0 1/4
Superiority of the culture -	TI.	7	103

How bad foever the old husbandry may be in an unfavourable season, and on a poor soil, yet the new, in this instance, has proved much worse; the repetition of the experiments indicate an uniformity in regard to the modern practice, which may induce a conclusion against using it.

"EXPERIMENT III.

Culture, expences, &c. of half a rood of a fecond field, foil similar to, or rather better than the former. 1766.

This piece of land was fixed on to try what the completest management in the old or new husbandry could effect with regard to oats.—It received the first plowing in November, 1764, on to the ridge to lay it dry for the winter. In the preceding March it had the first spring plowing.

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In April, the third earth was given, when it was twice harrowed. The first week in May, it was manured with two loads of compost, consisting of equal parts of coal ashes, mother rubbish, hogs dung, &c. all town manure, gave it two more plowings in the same month, and another in June. From thence to October, it had a plowing every month, the last of which threw it on to the ridge. In the beginning of March, 1766, again plowed it, throwing half of it on to five feet ridges, and half on to common three feet ridges; and soon after arched up the first by another earth, and, harrowing it sine, drilled three rows of white oats on the crown of each ridge, one foot asunder, using half a peck

of feed; at the same time harrowed a peck and a half on the other part. The corn came up in a very luxuriant manner. Hand-hoed the rows of the drilled the last week in April, and horse-hoed them in the begining of May, which was repeated before the expiration of that month. Two more horse-hoeings, a hand-hoeing, and a weeding, were given in June. The first week in July, hand-weeded it again. Reaped it in the begining of August. Produce two bushels. Mowed the broadcast at the same time. Product five bushels and half a peck. The proportion, per acre, as follows:

BROAD-CAST.

EXPENCES.

200	a lint is	1.	s.	d.
Twelve plowings -	verion.	0	12	0
Harrowing	-	0	0	6
Water-furrowing	-	0	2	6
Seed	-	0	12	0
Sowing -		0	0	3
First manuring -	The same	2	16	3
Second ditto	E 20 7/21	0	8	0
Mowing	Man Tellin	0	I	2
Harvesting -	1/8 / 2014	0	1	3
Threshing -	best or	0	10	3
Rent, &c.	n etants. Per etant Is tank	5	4	7 0
		6	18	7
PRODUC	F			
Ten quarters two bushels, at 18		0	•	0
Expences		6	18	7
Profit	•	2	10	5
U 3			Plow	ing

o d it n k

Plowing Harrowing Manuring & Second ditt Carting in	the first to o harvest		l. s. 1 18 0 1 3 0 0 10			n j plan nya in rai rai na nya in
I He above	Profit	- 10	er (20 1 0) ja	_	10	5
Loss	÷ 111	- charg		2	10	8
	DR	ILI	LED.			****
Twelve plo	wings	W of a	20	0	12	0
Harrowing		-		0	0	-
Water-furr	owing	-	24	0	0	6
Manuring				0	3	0
Sesd	•	-	•	3	4	8
Drilling		aria -	more and	0	0	
Four horse-	hoeings	-	- Andrews	0	2	8
Two hand-	hoeings	-		0	7	3
Two weeding	igs	-	- 1	0	2	
Reaping	9	-	1 1	0	2	6
Harvesting,	αc.	111111111		0	1	4
Threshing	-	-		0	5	0
				5	6	81
Rent		-		.1	14	0
			0.7	7	0	8:
	PR	ODU	CE.			
Four quarte	ers at 18s		50	3	12	0
Loss	-	-		3	8	81
Plowing Harrowing			l. s. 1 8 0 1	d. 9 1 1 2		
					9	101

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and the			
		Service .	18 19
0 0	3	· Mary	
0 4	0		
0.0	61	F. 1.8	- 4
	-		2 19
	5	5	4
World William	-		
Bur - Park	8	14	01
<u>-</u>	2	10	8
area area area	6	0	65.1
	1 9 3 10 0 0 0 4	0 4 0 0 0 6½ 5	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$

In this experiment, though the crop is much better than can generally be expected by a drilling, being in itself considerable, yet the loss is vastly greater than by the broad-cast, in so much, that (as it is observed) it may well be deemed decisive.

In effect it appears, upon the whole, that it is quite abfurd to adopt the new husbandry instead of the old in the culture of oats; and the experiments are so much on one side of the question, that it would be tedious to continue them any farther.

As to the quantity of feed proper for fowing this grain, it appears, that about feven bushels, per acre, is likely to produce the greatest and the most advantageous crops. The time of sowing the white oats (as confirmed by experiment) is from the latter end of February to the beginning of March; but the black fort admit of being much earlier put into the ground.

C H A P. IX.

Of Buck Wheat ;-its Culture and Management.

HIS plant, though it is ranked as a species of corn, is scarcely to be allowed that name; nor does it grow like the other esculent grains in general. Its leaf, from being roundish at first, takes nearly the shape of that of ivy, than which it is

however longer pointed, and much fofter.

Its stalk is round, hollow, and weak, fometimes reddish, but most commonly green, and it grows to the height of about two feet and a half. Lateral branches, which shoot out at almost every joint, are terminated by flowers of a purple colour, which are fucceeded by small triangular seeds, black on the outfide, and white within. It will thrive on almost every foil, not excepting barren lands, as they are commonly termed; but grows largest on dry ground which has been well plowed, and yields a very great increase. It is generally esteemed, that when it is raised for its grain only, a bushel of seed is sufficient for an acre of land, which has been known to yield, according to the accounts that fome give, between fifty and fixty bushels; but when it is intended for green fodder, which is the use most commonly made of it in this country, some people fow three or four bushels on an acre, in order to have a thick crop; and their usual time of fowing it is about the beginning of May; but if it be fown fomewhat earlier, and a warm feafon enfues. it will bear cutting twice in the fummer, as it is generally found to come up foon, and to ripen in a short time.

When mown, it is customary to leave it in the field several days, that its stalks may get dry before

fore it is housed. Its seeds do not easily fall off, for which reason it is seldom found to be greatly injured by wet. These seeds are excellent food for pigeons, and most kinds of poultry, as also for hogs, rabbits, &c. and have commonly a good effect in making horses thrive, when given among their oats. But for this purpose, the best practice is that of just crushing them in a mill, that they may not pass through the cattle whole. The flower of this grain is very white, and makes a good fort of pancake, when mixed with a little wheat flour. The poor in some countries even make their bread of this mixture; however it is generally too windy to be nourishing.

The straw or haulm of the buck-wheat is also given dry to cattle; but the best way is that of feeding off while green, particularly just before it blossoms. Milch cows fed with it will yield an extraordinary quantity of milk, remarkably good for making butter and cheese; and another advantage that attends this pasture is, that it will continue green in the driest time of summer, and in the hottest seasons, when the grass in general is burnt up. It is an excellent dressing for land, when it is plowed up without being mown, as several who have used

it so have taken notice.

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As this is an article by no means fo important asfome others, I shall add but a few experiments made upon it to try its nature, increase, &c. the result of which, with what has already been said, will be sufficient for the farmer's purpose.

"EXPERIMENT I.

Culture, expences and produce of ten perches of a field, of a light gravelly loam. 1764.

This piece of land received the first plowing in 1762. During the succeeding summer it was fallowed,

lowed, receiving five plowings. In March 1764, the feventh earth was given, and in April another stirring. The first week in May, it had the eighth, after which it was harrowed, and sown with one fourth of a peck of seed. Small as this quantity might seem, the plants rose very favourably. Mowed in August. The produce two bushels and a peck. The proportions, per acre, as follow:

	EXPEN	CES.			
Arrest Alice Control			Z.	5.	d.
Nine plowings		-	0	9	0
Harrowing	AL & STORY 1300	Marian Sal	0		2
Seed one bushel	1 -	-	0	2	0
Sowing -			0	0	3
Mowing	1977 1977 1977 1978		0	I	0
Harvefting	Vivi Tona Wandan		0	1	6
Threshing	mar Albert	rung d <u>e</u> r E stoe ri	0	4	6
			0	18	5
Rent, &c.			1	17	0
P 162 Marsh		\$1.4	2	15	5
	PROD	U C E.		US).	2
Four quarters f	our bushels,	at 16s.	3	12	0
Expences		-	2	15	7
Profit -		- l. s.	d.	16	5
Plowing -	-	0 13	6		
Harrowing		0 0	3		
Carting in harve	est -	0 0	3 =		
			0	14	01
Clear profit	•	5	0	2	61/4
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On this crop the profit is but trifling; and yet it cannot be called a bad one, four quarters and a half per acre are a confiderable produce, at least of any other grain, whatever may be thought of buckwheat.

"EXPERIMENT II.

Culture and expences of a fecond field, the foil a a woodcock loam. 1764.

In 1763, this piece yielded white peafe, the stubble of which was plowed up in October on to the ridge, and water furrowed, to lye dry in the winter. It was stirred in April again, and a third time the eleventh of May, when half a peck of seed was harrowed in. This crop flourished very well through the season. It was mown in the beginning of August. The produce four bushels three pecks. Proportion per acre as follows:

EXPENCES.

	200		Z.	s.	d.
Three plowings	-	-	0	3	0
Harrowing -	-	-	0	0	01
Seed -			0	2	0
Sowing -	-	-	0	0	3
Water-furrowing	2914111	7	0	0	3
Mowing -	-	-	0	1	0
Harvesting -	10-50	-,117	0	2	0
Threshing -	die Avili	- 3.50	0	4	41/2
			0	13	3
Rent, &c.	- 15		0	17	0
	4 15		1	10	3
	and the same				

[300] PRODÙCE.

Four quarters fix b Expences -	ushels,	at 16s	4 2 2 4	1. 3. 1	s. 16 10	d. o
				2	5	9
		1.	5.	d.		5.65
Plowing -	-	0	3	0	i ka mak	4
Harrowing -	-	0	0	2 1		170
Carting in harvest	•	0	0	31		*
		75.7		0	3	6
Clear profit -			-	2	2	3

This was a confiderable crop, and very profitable, compared with what one of barley might be fupposed to produce on this land, without other management. And it seems, from this trial, that buck-wheat, does not require so much fallowing and tillage as barley: From the preceding trial not yielding so good a crop, I think there is reason to suppose the crop not the better for it.

"EXPERIMENT III

Culture, expences and produce of half a rood of the first field. 1765.

In 1764, this piece yielded turnips, which were drawn for cattle in December. The land was plowed up in March; it had another earth in April, and a third in May, in the middle of which month it was fown with half a peck of feed, and harrowed fine. The turnips had been dunged for in the common manner. The crop made a very good appearance. It was mown in the middle of August. Produce five bushels.

EXPEN-

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[301] EXPENCES.

14 41	+ 1 11	C.L.J.			
			1.	S.	d.
Four plowings	1000		0	4	0
Three harrowings			0.	0	4
Seed -			0	2	0
Sowing -			0	0	3
Water-furrowing		-	0	0	3
Mowing -			0	I	0
Harvesting -			0	-1	0
Threshing -		•	0	5	0
			0	14	1
Rent -	•	•	0	17	0
			1	11	I
PR	ODU	CE.	18.57	21 6	
Five quarters, at 24		A TOTAL WASHINGTON	6	0	0
Expences -	andodi.		I	11	6
Profit -	MAN STATE	ager got	, 4	8	6
comment should be go			d.	.gr	
Plowing -	1	0 9	7		
Harrowing -		0 1	I 1/2		
Carting	•	0 0	61		
and a called by the			0	11	3
the part wirely light	hento		3	17	3
A separate and a language and a	Marie 1	3	1 -13	Va 355	L'N'S

This is a confiderable profit, and more than could have been reaped from barley, without better preparation. It should appear also (as my author expresses) from this as well as from other experiments, that buck-wheat should not be sown earlier than the middle of May. At least the expences of this crop shews, that such a method is by no means improper.

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"EXPERIMENT IV.

Culture, expences and produce of two acres of a field, the foil a light loam. 1766.

Plowed the fourteenth of April, harrowed it the nineteenth. Plowed on the fixteenth of May, fowing it with four bushels of buck-wheat, and harrowed it twice in a place. Mowed it August twenty-seventh. Carried home September eighteenth. Product three quarters seven bushels. Of the best three quarters, and of screenings seven bushels.

EXPENCES.

LATENC	Д 0.	l.	s.	d.
Two plowings -		0	4	0
Ditto harrowings -	-	0		6
Seed	- /	0	12	0
Sowing		0	0	3
Mowing -	•	0	2	46
Harvesting -	-	0	3	
Threshing -	-	ó	- 4	6
		1	8	1
Rent, &c.	•	1	14	0
7.		3	2	I
PRODU	CE.			
Three quarters, at 24s,	-	3	12	0
Seven bushels of screenings		0	15	0
Expences		4	7	0
Profit 12s. 4d. per acre	•	3	2	4
		1	4	8
]	Plow	ing

[303]

	,	1.	s.	d.			
Plowing - Harrowing -	4	0	9	7			
Harrowing -	-	0	Í	6			111
Carting in harvest	-	0	I	. 1	-	2 :11	15
ant r rows i					0	12	2
Profit 6s. 3d. per acre				1	0	12	6
		411			_	Wash	

"EXPERIMENT V.

Culture, expences and produce of ten perches of the first field. 1767.

In the year 1766, this piece yielded cabbages in complete culture. These were drawn for cattle in Janury and February, and the land lest in the ridges on which they were raised till March, when it was plowed. In April another earth was given, and a third in the middle of May, when it was sown with a quarter of a peck of seed, and harrowed thrice. The crop was luxuriant, but some of it was beaten down. Mown the last week in August. Product sour bushels and two pecks.

EXPENCES.

* 41		2	1. s.	d.
Three plowings			0 3	0
Three harrowing	-		0 0	5
Seed -	-	-	0 .3	0
Sowing -		-	0 0	3
Water-furrowing	-		0 0	4
Mowing -	-	The most	OI	3
Harvesting -			0 2	0
Threshing -	4 - 2 - 3		0 9	0
D 0			0 19	3
Rent, &c.	-		0 17	0
			1 16	2
			P	RÖ-

	P	R	O D	U	C	E.	l.	s.	d.
Five quarte	rs, at	245.				,	10	16	0
Expences			•		•		1	16	3
Profit	-				1.	- s.	8	19	9
Plowing		-	-		0		3 3 4		
Harrowing	-		-			í	11/2		
Carting in h	arvest		•		0	0	61		
							0	8	I 13/4
Clear profit		-				-	3	10	9‡

The above is a fresh instance that buck-wheat cannot be depended on in point of profit, how rich soever the soil may be; so that it does not thrive only on poor lands. And the result of all these experiments is, that this grain is of some consequence to farmers, who (as Mr. Young justly remarks) would do well to cultivate it in all parts of the kingdom.

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CHAP. X.

Of Pease; their Culture and Management, with the Result of the Old and New Method of sowing them, &c.

PEASE are of various kinds and denominations. Mr. Miller, however, places them in three classes, the common white, the grey, and the pig pea; while Mr. Lisle reduces them under two different heads, viz. the tender and the hardy small fort, and the

the tender and the hardy large fort, under one or the other of which heads, he thinks, all the various forts of peafe may properly be ranked, be aufe he has found them equally to agree or difagree with the fame foil. According to his own experience he is fatisfied, that the best way to make pease pod well, is to sow them upon a mellow mould, rendered light by plowing; and after they are sown, he recommends to the farmer to roll the ground.

Peafe, and other podded grains and fucculent plants, are generally esteemed the most excellent destroyers of weeds, and preparers of the land for other crops. The Rev. Dr. Eliot of New England fays, he has many times known farmers in that country invite others, who had peafe to fow their land, without paying any rent, merely on account of the good effect they would have in preparing the foil for wheat. " Pease (fays he) make a shade, and when the ground is shaded, the air will be condenfed, and confequently will make room for the rushing in of fresh air; so that in this shade there will be a greater lodgement of the nitrous falts. and confequently the land will be made rich. fame is found by experience to be true of potatoes, which are therefore accounted to be enrichers of land."-" If it be so (continues the Doctor, obviating an objection which might arise) it may be asked—Why do not weeds, which cast a shade also, enrich the ground?—The reason is plain: because the earth is not tilled, and so prepared to receive and retain the fertilifing dews and falts of the air." Many experiments in regard to the breaking up of new foils, and fitting them for cultivation, as well as for preparing the land for new crops, some of which have been already recited in this treatife, confirm the general truth of this affertion. It has been likewise observed, that it is even a rule with farmers, not to fow the fame land a fecond time

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with peafe, till five or fix years after the former crop of the same kind, because, till then, the ground in which they grew continues so rich, as to make them run luxuriantly to haulm, in a manner inconsistent with any great desire of fertility.

A light fandy land, or a rich loofe foil, are generally recommended for the white pea. This is generally fown in broad-cast, and only furrowed in. Three bushels of feed is the usual allowance for an acre of ground, and the common time for fowing them about the latter end of March, or the begining of April, upon warm land; but on cold foils, a fortnight or three weeks later is generally preferable. If they are fown in drills, a bushel and a half of feed is commonly reckoned to be fufficient; and when they are thus fet regularly, the ground may be stirred with a hoe, in order to the destruction of the weeds, and earthing the plants, in order to improve the pease, and render them easier to be cut, when they have attained a proper degree of ripenels.

"The green and the purple rouncivals (fays my author) require a stronger soil than the white, and should be sown a sittle later in the spring, also in drills, but farther afunder, because they are apt to grow rank, especially in a wet season. The ground between the rows should be stirred two or three times with a hoe, which will not only deftroy the weeds, but, by earthing up the peafe, will greatly improve them, and also render the land fitter to receive whatever crop is to be put into it the enfuing feafon.—The grey, and other large winter peafe, as they are called, are feldom cultivated in gardens, because they require a great deal of room. best time for sowing these, is about the beginning of March, when the weather is pretty dry. distance between the rows should be three feet, and these pease should be sown very thin in the rows; for if they are fown too thick, their haulm will 1pread

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fpread so thick as to cover the ground, and they will ramble over each other, by which means many of the plants will be rotted, and hindered from bearing. The common allowance of these large peafe, is two bushels to an acre; but that (small as it is) is more than confifts with the very thin fowing, which is best for them.—The grey pease in particular, thrive best on a strong clayey land, in which they are fown commonly under furrow. But by this method of fowing, large peafe especially, are always planted too thick, and at unequal depths, which prevent their coming up regularly. this reason, drills are recommended for all rank growing plants. If only a small spot of ground be planted with these pease, a channel about two inches deep may be made with a hoe, guided by a line, the feeds may be dropped therein, and the earth may be drawn over them with a rake. By these means they will be covered equally, and with tolerable dispatch, though not sufficient for large fields, where, for this reason, a shallow furrow is commonly made with the plough, the feeds are scattered in it, and the earth is harrowed over them. The greatest trouble then remaining is, to keep the plants clear from weeds, and to lay the earth up to their roots, which, in countries where labour is dear, is very expensive to have done with the hand-hoe, but may be easily effected by drawing a horse-hoe between the rows. This will certainly eradicate the weeds, ftir well the foil, render it mellow, and greatly promote the proper growth of the plants. All forts of peafe love turned or marled land; but when these are sown late in the feafon, the foil should be strong and moist, lest they should then come up, and perish in a hot light land, or at least not produce a crop that is worth taking off the ground. Some advite also to keep them for twenty-four hours in water before they X 2 are

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are fown, as well to separate the faulty from the good, as to enable the latter to rise the sooner, by being thus moistened. In general the larger the pea is, and consequently the later its usual time of ripening, the earlier it should be sown, as Mr. Liste infers from some curious observations which he has

made in his course of practical husbandry."

Amongst these observations, the above-mentioned gentleman, in the year 1708, when the garden peafe were near a foot high, remarked on the top of them a purse, or nest of buds of blosfoms lying in a bag together, but seeing that there was no shew of blossoms putting forth at the lower joints, he imagined that the peafe would miscarry that year. But in a day or two after, he looked again into these upper pods, and upon discerning a number of them, found fometimes in a fingle one near thirty buds of bloffoms, two or three of them generally appearing more forward than the rest, which seemed to lie in a huddle. As he had never feen, excepting the crown pea (that carries its blossoms at the top like a nosegay) other pease put out above two bloffoms, and kids at the top, which feldom comes to any thing, he suspected that the many bloffoms in this pod must form the successive gradations of bloffoming joints, arifing from that stock as from a common root, and that every one shot out in order, as it grew forwarder than the rest, while the main stem advancing higher, left behind the subaltern blossom of a lower joint. By way of experiment, therefore, he tied scarlet threads just under several of these pods, that he might know them again, and found in about five days time, a gradation of bloffoms arifing from joints with lobous leaves above his fcarlet thread, and the pod of blossoms still advanced on to the end, leaving behind farther joints of bloffoms, till the whole stock was spent in the same manner.

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Mr. Lifle infers from hence, first, That by looking into this pod or purse of buds while it is yet so much in its infancy, as only to be viewed by a magnifying glass, one may judge what hopes there are of a future crop; and, fecondly, that we may learn from thence, what fort of peafe to adapt to each particular ground.—" But (adds he) before I enter upon this, I must, for the better understanding thereof, premise, that the farmers vary in their judgments in no one point so much as in the nature of the pea. Several forts of peafe are commonly fown within the limits of the fame parish, and each of the persons who sows these generally has a great prejudice against any other forts than that which he adopts, having perhaps been disappointed of his expected return from other peafe when he has fown them, and being, for the fame reason, equally dispoled as readily to alter his opinion of his last favourite kind; for the produce of a crop of peafe is always very uncertain. But if the farmer would consider how rath-ripe a pea is, or how late ripening in its nature, and that (as all its stock or power to put forth the bloffoms, lies within the foliage of one pod) fo to fow the peafe in fuch ground, and at such time, that each fort of pea, according to its nature, may, before autumn or cold weather comes to check them, fend forth all its gradations of points or bloffoms, fo that none may become abortive for want of fummer enough to enable Nature to bring her embryos to maturity, and even the bud-bloffoms into kids;—then it is apparent (as all large peafe ripen late, and run to great haulm or stalks, and small pease have less haulm, and ripen earlier) that the great or late ripen peafe should be fown as early as the climate will permit, because thereby fuch pea will get so forward as to have time to put forth all its gradations of bloffoms and kids, and to perfect these before a rainy autumn

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comes, and put a stop to farther vegetation. Again, great peafe ought to be fown on a white or fome raifed land, not too gross of juice, but not on a cold clay, as the moisture of this last will keep feeding the haulm, and be inconfiftent with the main defign of fowing them early, which is, that they may bring all their fruit to maturity in due time. The white or mixed mould must be in good heart, as otherwise it cannot maintain a great pea. the other hand, it is evident from hence, that a pea which ripens early should be fown on a strong teeding land, because such land will nourish it more vigorously, without too great increase of its haulm, which is naturally fhort, and notwithstanding the coldness of the foil, there is no doubt but that all the kinds will ripen.

Such are Mr. Liste's observations upon this subject;—and it would certainly be worth the while of the lovers of agriculture, who have it in their power to try the modes which he recommends. These, as well as others, can only be confirmed or rejected

but as experiments accurately attended to.

While the peafe grow, moderate rains are generally found ferviceable to them, particularly at the time of bloffoming and filling up the pods; yet too much rain has been found prejudicial. The blueish bloom upon their leaves is generally considered as a sign of their health and vigour. And Mr. Liste is inclined to think, that they neither ripen nor harden so well upon high grounds as they do in valleys.

Amongst the arguments used in favour of the horse-hoeing this vegetable, the following, which Mr. du Hamel has given us, may be reckoned as

of some consequence.

M. de Villiers, one of his correspondents, in April, 1753, sowed a small field in Champagne with

with peafe in double rows. Being unprovided with a proper instrument to hoe the intermediate spaces, he made use of a narrow, angular kind of share, which stirred only three or four inches on the outfide of the rows. Most of the pease in the neighbourhood were destroyed by a fort of vermin, called vine-fretters. His were the least damaged of any, which was probably owing to the vigour of the plants, or the infects being killed by ftirring the ground. On a comparison of the produce of this fpot, he fays he found it yielded fix times as much as the same extent of the best land in the same coun. try. In a good year (M. du Hamel owns) the difference would not have been so great; but still he infers, that the experiment is sufficient to prove the excellency of the horse-hoing husbandry in ge-Yet some experiments made with the utmost precision, have shewn it in many cases to be quite abfurd. The benefits and disadvantages of it, with regard to peafe, we shall consider before we conclude this chapter.

But to proceed:—The next year, M. de Villiers being provided with M. du Hamel's drill and horse-hoe, sowed pease again in rows, in some places two feet, and in others two feet and a half asunder. But this distance was so small, that it rendered the horse-hoeing very difficult in many places, and in some persectly impracticable. He was therefore obliged to contrive other means of stirring the ground, in which, notwithstanding this, his pease flourished well, and yielded more than any others in the best land in the same neighbourhood.

In the year 1755, the same gentleman drilled pease again in a strong heavy soil, in which no one had ever ventured to sow any in the common husbandry. These grew as high as if the ground had been well sitted for them, and yielded half as much again as any sown in the common way, besides the

faving of the feed, which was about one half. They were fown in double rows, with a space of about two feet and a half wide, between the outermost rows of one range and the next outermost row of another; and this space was prepared with the horse-hoe.

It is generally recommended, when any particular fort of pea is intended for feed, to look the plants carefully over whilft in flower, in order to draw out all such as are not of the right fort; as there will generally be fome such, which, if left to mix, will degenerate the kind. So many rows as may be thought fufficient to furnish the quantity of feed that is wanted, should then be marked out and left till their pods turn brown, and begin to split, when they should be immediately gathered up with the haulm; and if the husbandman has not room to flack them till winter, they may be threshed out as foon as they are dry, and put up in facks for use; but particular care should be taken not to let these remain too long abroad after they are ripe, because wet would rot them, and heat, after a shower of rain, would make the pods burft, fo that a great part of their contents would be loft.—" These precautions indeed (adds my author) are more eafily observed in a garden than a field, where much larger quantities are raifed; but they are highly proper also in the latter, and will reward the extraordinary pains of the husbandman, who should not continue to fow feed of the fame growth upon the fame ground longer than two years at most, but should rather exchange his feed every year. When these are reaped, which is generally done with a long flick, they are laid up in small heaps, and left in the field till their haulm and pods drop away; but during this time, they ought to be turned frequently, and raifed from the earth as much as can he, that they may lie hollow, for the wind to dry them,

them, especially when any rain happens to wet and beat them down. In some countries they house none of their pease, but set them all abroad in stalks, because they say that setting them abroad gives them a good colour, but laying them up in a barn makes them look dark. There are some places also where they mow their pease; but this is reckoned a bad practice, as the scythe must necessarily cut many of the pods as a funder, and thereby consequently prove the occasion of shedding a very great

part of the grain.

These are the general directions, and such as are mostly received for the culture of this kind of pulse. It is a little extraordinary, however, that for every kind of plant, M du Hamel, and some other authors whom we have quoted, should be so bigotted to the horse-hoeing husbandry. Pease, as we shall shew hereafter, are far from answering the worst of any plants; yet it does not appear that they are fo much the better for it in general as the above obfervers fay they found them. I shall here subjoin an experiment or two, which, being taken from proper authority, may let the matter in a clearer point of view than bare affertions; but where these have generally turned out fo much alike, they will not, in future, be multiplied or enlarged upon in this treatife, as some people have done, who have made their work journals, valuable indeed for the matter they contain, but too tedious for the farmer to read, and too high a price for him to choose to purchafe.

In the first place, the *improved* husbandry often deserves recommendation in regard to this kind of pulse, but it may be carried too far when the luxuriance of growth is too great, the reason of which, however, is that the crop of straw being too weighty, cannot keep itself from the ground.

We shall therefore agree with Mr. Young, that the best culture for pease, and that which he has termed in this case, the improved culture, is that which does not force fo luxuriant a growth; fuch as the introduction in a course after other crops that have been amply manured, and which have taken off the first fire of the dung, or else in common husbandry, either on land in good heart, or fallowed for, or upon a common manuring; and this kind of culture having been found by experience to be twelve times more profitable than the common, leaves the matter beyond dispute; even without taking it into the account, that the land is generally little the worse for them. And this spirited husbandry is the more to be recommended, as it confifts in nothing but the common methods exerted in a spirited manner, and employed with a degree of judgment which may be possessed by every farmer, and applied to this profitable culture.

By way of comparison between the old and new methods of cultivating pease, the reader may take the following experiments, and the consequent remarks upon them.

"EXPERIMENT I.

Culture, expences and produce of half an acre, two divisions of a field, the soil a loose woodcock loam. 1764.

During 1763, this piece was fallowed, receiving in the month of October in that year, fix plowings, the last of which threw it on to the ridge. In the March following, two earths more were given, dividing it into two roods, and leaving one on the common ridge, and the other on five feet ones; arched up the latter by the ninth earth the end of April. Harrowed it fine, and drilled each ridge with

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s, ne n, ne with three rows of white peafe, using two pecks of feed. At the same time plowed the other half, reverfing the ridges, and harrowed in three pecks of the same seed with the common ridge harrows. Horse-hoed the rows the last week in May, turning a furrow from the peafe, and raising a small ridge along the middle of the intervals. In a few days afterwards hand-hoed the rows clean with eightinch hoes, loosening the land thoroughly, and plucking out the weeds that grew in the rows. Gave the fecond horse-hoeing, June the eighth, reverling the last; but this was not done with the fame ease; it was irregularly performed, on account of the stalks spreading. In some places they fell into the furrows, in others on to the ridges. Hand-hoed them again directly, in the same manner as before, but with more difficulty from the growth of the peafe. The third horse-hoeing could not be given in the manner intended, that of reverfing the second; the intervals were obliged to be struck in the same path that the second mowed in, breaking up the ridges, but it was not done without damaging the crop by the horses and the The rows afterwards received a weeding, which completed their culture. The peafe were hooked in August, the product three bushels. The broad-cast rood, which received only a slight weeding, was cut at the same time. Produce, six bushels.

Account of the Drilled Rood.

EXPENCES	. l. s. d.
Nine plowings	0 2 3
Harrowing	0 0 0
Water-furrowing -	- 0 0 5
Drilling	- 0 0 Q _x
Seed	0 2 0
Three horse hoeings -	. 006
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Two hand-hoei	ngs	344	n•1.55		. 0	2	4
Two weedings		*	300	· LE		0	9
Hooking	1.00	MY DE	965			0	0
Harvefting	10101	4466		• 4			6
Threshing		V TOWN	4		. 0	0	4
-145						Y NOTE	3
Dant Ste							1 3 4
Rent, &c.			Second Control		0	8	6
•					0	-7	-3
	PR	ODI	U C F	i.		1/	7 4
Three bushels		-	•		0	12	0
Lofs	-		•		0	5	7 3/4
					d	dis	
Plowing -			0	-	41		
Harrowing -	1.50	•	0	0	I 1/2		300
Drilling -		-			01		
Horfe-hoeing	-	•	0		3 4		P. P. W.
Carting in harve	ıt	/C •	0.	0 (03/4		7.13
9					0	3	11
Total loss	=				0	9	6
Account	of t	he Bro	oad-ca	ft R	ood.		
E	XF	EN	CE	S.			
30 810	4				1.	s	d
Nine plowings					0	2	3
Harrowing -		-	18-11		0	0	01
Water-furrowing		-	-		0	0	3
Sowing	-	. 198			0	0	0 3
Seed -	-	**	-		0	3	0

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Weeding -	mil Ed s	WW CO	12	. 0	0	6
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Six bushels, at 32s.				1	4	10
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Profit -	w Total		•	0	7	14
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Carting in harvest	14 42	. 0	0	04	dot	1
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ter bron-beed sale		11,380		_	3	1 ME
Clear profit, 14s. 20	d. per a	cre		0	3	61
sent of general and the second		i ne		-	70.01	OHI
Loss by the horse-ho		100		0	9	61
Profit by the broad-	cast	1 200		. 0	: 3	63
on the day of the	efiste vi	Ethba	24	1 104	X = 7	bit.
Superiority of the la	atter	10.25	11.1	0	13	03
COMMENT THAT WILL SEE	DEC 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	in ato	493 's	District In	1775	100

The above experiment turns out much in favour of the old husbandry, though neither of the crops was so good as might have been expected, a whole year's fallow for pease being an uncommon preparation. Perhaps the wetness of the season on a moist

moist land did not agree with the tenderness of this pea. However that might be, it was plain that the horse-hoed crop was by much the inferior one.

"EXPERIMENT II.

Culture, expences and produce of thirty perches of a fecond field, the foil a light, gravelly loam, 1765.

In 1764, this piece yielded turnips, which were drawn for cattle in January. The first week in March, gave it the first plowing, and the second at the end of the same month, throwing one third of it into sive seet ridges, leaving the other two-thirds slat. Gave the seed earth in the middle of April, when the ridges were arched up, harrowed, and drilled in three rows one foot asunder, with a quarter of a peck of white pease; the other thirds plowed again on the slat; harrowed in a peck of seed, broad-cast one and drilled the other, in equally distant rows one foot asunder, with three-quarters of a peck of the same.

Horse hoed the ridges, June the fifth, turning a furrow from the rows, and throwing up a ridge in the middle of each interval; then hand-hoed the rows, and also the equally distant ones. On the mineteenth, gave the second horse-hoeing; but more were not given, for fear of damaging the pease, as this last had done some mischies. In a few days after, repeated the hand-hoeing of both the ridges, and the equally distant rows, which concluded the culture; the dryness of the season seeming to render more attention of this fort unnecessary. Hooked all the three crops the first week in August. Product of the horse-hoed, three pecks. Of the equally distant rows, one bushel and a peck.

Of the broad-cast, one bushel.

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Account of the Horse-hoed.

EXPENCES.

EXPER	NCES	· ·		1 15
	7. 70	1.	s.	d.
Three plowings -		. 0	3	0
Harrowing -		0	o	6
Seed	-	. 0	4	0
Drilling -		0	0	3
Two horse-hoeings		- 0	1	4
Two hand-hoeings -		.0	6	6
Cutting -		0	τ	6
Harvesting -		. 0	I	6
Threshing -	-	0	2	0
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Twelve bushels, at 325.		2	8	1,93
Expences -		' 1		7
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Profit	1 4 4 9	- 0	10	5
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Plowing	0	3 0		nine
Harrowing	0	0 63		lora
Drilling	a	0 3	Hill	
Horse-hoeing -	0	2 0		day
Carting in harvest -	0	0 6	29	ghri,
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Account of the equally distant Rows.

EXPENCES.

	EA	PE	N	CE	. S.				
							1.	s.	d.
Three plowing	5		1			1/2	0	3	O
Harrowing		~	-		-		0	0	6
Seed -			-				0	12	0
Drilling -			4				0	0	6
Two hand-hoe	ings		-		-		0	II	6
Hooking		781					0	2	6
Harvesting		-		-	* **		0	2	0
Threshing							0	- 3	4
									100
							1	15	4
Rent -				Hu T	8 1		0	17	0
10 1 17 12 01 2 1		-						200	NIN I
et gewone skiller e							2	12	4
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Twenty bushels								0	0
	, 41	323.		1 13	Sin		4 2	0	0
Expences				1	6 . 5		_	12	4
Profit	4	4	, I to				1	7	8
I TOME						2		1	
S Harris				7.	s.	d.			
Plowing	1			0	3	0			
Harrowing				0	0	63			
Drilling				.0	0			4	- 114
	-01			0	0	5 6		135	
Carting in harv	CIL			Ü	U	0 3		1	HALL
ST The American					- 1.1	1500	0		61
					1		_	4	4
Clear and Cr	. 1		-				-	_	I 3/4
Clear profit	•		•,		•		I	3	4
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personal from the person through your		PE	N (CE	5.		1.	5.	d.
Three plowings		-					0	3	0
Harrowing	=		-		•		0	0	6
							-		
							0	2	6

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Brought over Seed Sowing Cutting Harvefting Threshing	0000		4603608
Case I was "The band-hosing between by a very ededual operation, effec- be close," and the peafe are your and before increasing a late. Young thinks, was peace used tooked, as in cordens	1 0 2	3	11.
Sixteen bushels, at 325. Expences a more than the same and the same at 10 and the same a	3 2	3	11
Profit and only a number of the state of the	no the		nura xtx ¹ 1 horti
callib ada gniareanoa noidean mundo el na war ed 61 gelbrosen gni rol lorri Clear profit rolla ed 1-2 12-63 5/4 yea.	9	4	1.
COMPARISON. Profit by the equally distant rows Ditto by the broad-cast	i	3	13 13
The former superior by 1114-1114-114	0		2
Profit by the equally distant rows - Ditto by the horse-hoed	I 0	3 4	1 ² / ₄ 0 ³ / ₄
The former fuperior by			ofit

	p. Pagas ac	1.	s. d.
Profit by the broad-cast	12 12	0	15 111
Ditto by the horse-hoed		0	4 0 3/4
The former superior by	· ·	0	11 11

The comparison here is clearly in favour of the equally distant rows. The hand-hoeing between one foot rows is a very effectual operation, especially if it be given while the pease are young, or from five to seven inches high. Mr. Young thinks, if the crops of pease were sticked, as in gardens, the produce would be vastly greater; as the twining round the sticks would answer the purpose of joining, at the same time that it would keep the plants out of all danger both from horses and from men.

The above-mentioned gentleman, who has purfued his enquiries into the nature of this plant very far, determines that the most advantageous quantity of pease to be sown upon an acre of land, is found to be from four bushels and an half to sive bushels and a half, though it is more than the far-

mers generally use for that purpose.

As to the point in question concerning the different modes of sowing, according to the new and old husbandry, he says: "The inferiority of the horse-hoed crops is such as does not admit of a doubt, while the equality, or nearly such of the equally distant rows, and the broad-cast is such, as may leave many doubtful which method is most beneficial. The product of the drilled exceeds that of the common husbandry, which shews that this vegetable affects the one more than the other; but that the expences of that mode being rather higher than those of the broad-cast, is a circumstance which more than ballances the superiority of product." He-says, if opinion may be allowed in a point

a point where experiments are so nearly equal, he should give it in favour of the drilled, provided the expences of a drill-plough did not exceed those which he has minuted. "For the rows (adds he) yielding the larger crop, and coming so very near the profit of the broad-cast, after paying the expence of much hand-hoeing, are circumstances, and give great reason for supposing the land after one method, in a much superior state than after the other; for a hoed crop that comes within a small matter (such as a shilling) of profit to an unhoed one, has many advantages to bal-

lance that shilling."

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The state of the soil is much urged in favour of the horse-hoeing crops by many writers; but Mr. Young differs from them in regard to peafe: My crops (fays he) twice horse-hoed, left the soil in a much worse state than the equally distant rows. This is the fact; nor do I think it difficult to account for. It is well known in common husbandry, that a crop of peafe large enough to smother the weeds (no uncommon thing) prepares for a crop of corn almost as well as a fallow. This is owing to the thickness of the shade afforded by full crops, which fo mellow the earth, and leaves the furface in so putrid a state, that it breaks up under the plough like well-fallowed land. All this effect is lost in horse-hoeings, when pease are of a virtue to admit full tillage of this fort, that is, four horse, and two or three hand-hoeings. Intervals wide enough for horse-hoeing, render the crop so thin upon the ground, as to preclude all advantage of thick shade; but how much more must this be the case, while only two horse-hoeings can be given, and the last of them hardly without damage. The weakness of the Italk of this plant is such, that it cannot support itself, but falls to the ground before it is half or three fourths grown; and acci-Y 2 dents,

dents, by which the direction of its descent is governed, may as well lay it in the intervals as on the beds themselves; so that the horse-hoeings, after it falls in this manner, cannot be performed without much damage to the crop. Hence the poor state of the soil after horse-hoed pease; it is deprived of the shade of thicker crops, and cannot, in return, enjoy the benefit of proper tillage."

C H A P. XI.

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Of Beans;—their Culture and Management in the old Method, and in the new;—Observations upon the different Methods.

THE garden-bean and the horse-bean are reckoned to be the two distinct species of what are properly called beans; though there are several varieties of the former which it is unnecessary here to notice.

The horse-beans, which more immediately fall within the province of the husbandman, are generally deemed to delight in a strong, moist soil, and an open exposure, but seldom to thrive well on dry, warm land, or in small inclosures, where they are very much subject to the blight, or to become the prey of insects, which often appear to come upon them in such quantities as to cover their stems entirely.

It is usual to sow these beans upon land that is newly broken up, in order that they may help to loosen and pulverise the soil, and destroy weeds, thereby rendering the ground fitter for corn after the crop of them is off, than it would have been before, if they are properly managed.

From

From February to March is the time in which they are generally fown, observing mostly to sow the strongest, wet lands last. In the old husbandry, three bushels is the usual quantity allowed to an acre.

"When land is newly broken up (lays, my author) it is the custom to plow it in autumn, to let it lie in ridges till after Christmas, and then to plow it in small furrows, and lay it smooth. These two plowings will break it fine enough for beans, which, at the third plowing, may be fown after the plough, at the bottom of the furrows, which should not then be made at most above five inches deep. This is the usual method; though some lay their beans before the plough, and then plow them in: but in either of these ways, they sare set as close as the furrows are made, which is too near; for when they are on frong, good land, they generally are drawn up to a great height, and are not fo apt to pod as when they have more room, and are of a lower growth. Mr. Miller has been convinced by fome late trials, that it is better to make the furrows two feet afunder, or even more; that the beans will then branch out into many stalks, and bear in greater plenty; and that the fun and air having, by this method, amore free admission between the rows, they will ripen much earlier, and more equally, than when they are planted closer together. But in either of these methods, particular care should be taken to cover them perfectly with earth; for if a bean lies hollow, it wastes itfelf before it reaches the mould fo as to shoot upward. The authors of the Maison Rustiques think, that the fertility of beans is greatly increased by steeping them before they are fown.

When they are planted according to the new husbandry, the ground should be plowed four times before they are set; this will break the clods of

the earth, and render it much fitter for planting. They are then fet with a drill-plough, so ordered as to dung them regularly at three inches distance from each other in the drill; by which method, less than one bushel of seed will plant an acre of land. When the beans are up, the ground should be ftirred between the rows with a horse-hoe, to destroy the young weeds; and when these are about three or four inches high, they should be catched up by another plowing between the rows. A third plowing, about five or fix weeks after this, will keep the ground clean from weeds, make the plants stalk out, and produce abundantly. An acre of beans cultivated in this manner, will yield ten bushels more than in the common method, in which last it may almost always be observed, that more than half of their stems have no beans on them; for, by standing close, they are drawn up very tall, and only the tops of the flalks produce, whilst all the lower part is naked; whereas, in the new husbandry, the points of the stems are shorter, the pods confequently grow nearer together, and they bear almost close to the ground.

Beans, when they are ripe, are reaped with a hook, as is usually practised for pease; though some think it is best to cut them a little before they are full ripe, to prevent their shedding afterwards when they are mown. After having lain a few days on the ground, they are turned; and this must be repeated several times, till they are dry enough to stack; but the best method is to put them up in small bundles, and set them upright; for, in this case, they will not be in so much danger of suffering by wet, as when they lie on the ground, and will be more hardy to carry to stack than if they were loose. They should lie on the mow to sweat, before they are threshed out; for as their haulm is very large and suculent, so it is very

apt to give, and grow moist; but there is no danger of the beans receiving any damage if they are stacked tolerably dry, because the pods will preserve them from injury, and the sweating serves only to make them thresh the easier; for they will not ever give again after they have once sweated

and become dry.

With beans of every kind, as with other plants, it is best from time to time to change the seeds, and not to sow and leave the seeds of the same fort long in the ground. Some judicious husbandmen are, therefore, careful to procure their seed-beans from land of a different nature from that on which it is to be sown; by which method they generally insure crops that are greater, and not so apt to degenerate.

With regard to horse-beans it is observed, that their general use is implied in their name; but as they are of a hot nature, care should be taken not to give them to horses in too great quantities. Sometimes their stalks likewise are used for fodder, in countries where there is a scarcity of fodder, and when plowed in green (a purpose for which they are frequently sown) they prove an excellent

manure.

Few attempts have yet been made to raise either garden beans or kidney beans in the open fields; though some of M. du Hamel's correspondents have declared, they found them answer very well when cultivated according to the new husbandry. M. Eyma, in particular, planted near Bourdeaux, in the year 1755, the common fort of garden-beans in a middling soil, not dunged, but thoroughly plowed a foot deep. The rows were two feet as funder, and the plants at the distance of a foot from each other. These beans so thinly sown, we are informed, being assisted by frequent hoeings, yielded a greater crop than any in the common way.

Y 4

Mr. Eyma gave the spaces between them a good plowing when they began to ripen, and on the twenty-third of June fowed in each of them a row of red kidney beans, which came up very well, He plucked up the garden beans in a fortnight afterwards, and gave the ground on which they stood a slight hoeing. These kidney-beans proved the finest that he ever faw. He repeated the same experiment in 1756, and furceeded beyond his own expectation. In other parts of France it is faid, the common, small, white garden-bean is fown in the fields in autumn, thrives well, and, though cultivated only in the common way, yield fuch crops that the country people there prefer it to any other fort. This, probably, is the kind meant by the person who (in The Essays on Field Husbandry) is said to have observed, that half a peck of the little, round, white beans, mixed with a bushel of rye, would make bread somewhat like the wheaten

It has been advised, that intelligent husbandmen should try, perhaps, more than they yet have done, (though still cautiously) what success will attend the culture of garden-beans in the field, when planted at such distances as will admit of a horsehoe between the rows. All fuckers that come out from the roots of these beans should be taken off when the plants are about a foot high; and when the blossoms begin to open towards the bottom of the stalks, the tops of the stems should be pinched off, in order to make the pods stand and fill. For want of this care, there have been instances of beans rifing to a great height without producing any feed. With care, fuch as enriching the ground with manure, drilling the beans in properly diftant rows, at a feafon when the young plants will not be exposed to killing frosts, and keeping them ed owl one siclear

Account

clear of weeds, there is a great likelihood that these will do well.

After what has been faid with regard to the fuperiority of the new husbandry over the old, we shall subjoin only two comparative experiments between them, which were the last of many that served to confirm the truth.

Reaping I THAMINAGEN

Culture, expences and produce of an acre and an half of a field in three divisions, the furface a woodcock loam, under that a clay. 1767.

In 1766, this piece yielded tares for hay. The stubble was plowed up in November, and it was water-furrowed. In March, plowed and fowed two-thirds of the piece upon the common ridge, broad-cast, using a bushel of tick-beans to each. Drilled the other third in treble rows, at one foot, on the five feet ridges, using three pecks of the fame feed. The division of the broad-cast crop was chiefly made to try the real utility of handhoeing, and the experiment made on account of its being observed that in some countries they never hand-hoed their beans. For which reason, this piece of ground stood in three parts, viz. One broad-cast hoed, another broad-cast but not hoed. and a third drilled, in order to compare all the three together, and to decide upon them accordingly. 1

The drilled part received four horse-hoeings and three hand-hoeings, the wetness of the year rendering all this tillage and manure absolutely necessary to keep the land in proper order. One part of the broad-cast was hand-hoed, and the other not touched. They were reaped in September. The produce as follows: of the-broad-cast unbocd, four bushels and one peck: of the broad-cast boed, eight bushels and two pecks: of the drilled, thirteen

bushels and two pecks.

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Account of the Broad-cast unhoed.

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"The grand object here (as my author observes) is certainly the comparison. The divisions were equal in every respect, except the hand-hoeing; to that whatever difference is found in the crop, must be owing to that alone. Such a comparison is indisputably decisive. Is it not extremely evident, that those saving farmers who will not bestow nine shillings an acre on hand-hoeing their beans, must be confiderable losers by their imaginary prudence? Another point remains to be mentioned, of yet greater importance, which is, the heart the land is left in by the crops thus differently managed.-After a hoed crop, the farmers frequently low wheat, confidering the beans fo treated as a fallow; and they get not only good but clean crops by this management, an effect that is merely owing to the hand-hoeing; for were they to omit that operation, their wheat-crop must inevitably be worthless, and fown under a certainty of loss. The bean-stubble in question unhoed was, after harvest, as full as possible of weeds; whereas, the hoed division was actually fit for wheat. Now the difference that arises, in a few years, from so small a variation as the expenditure of nine shillings, is prodigious. At the end of the first year there is a balance of one pound, five shillings, at the end of the second there is the expence, on one fide of a year's fallow, but on the other the profit of a wheat crop, which is an immense difference. After the fallow, wheat may be supposed to succeed, and after the wheat, beans again, which, though they may not equal the opposite crop of wheat, yet will be a profitable crop; after them barley, and with that barley, clover; and upon that clover, wheat; which is a most profitable course; whereas, in the other management, the wheat must be succeeded by barley or oats, and without clover. So that this fingle variation, flight at first, becomes a matter of

great consequence. The other method here tried. viz. the drill-culture, is found far superior in all these circumstances. The profit of the beans is 11. 19s. 11d. superior even to that of the hoed crop, which is very great, and proves the importance of cultivating them in this manner. The horfe-hoeings, and the effectual manner in which the handtillage is performed, from the crop's being fown in rows, make the beans shoot out with uncommon vigour, and yield more numerous, and better filled pods; and, in respect to the preparation made by the crop for others which are to follow, there is no comparison in the state of the land. The drilled part has not a weed to be found, and is befides in a fine state of pulverifation, equal to most fallows, and superior to many, which last alone is a most material circumstance.

"EXPERIMENT II.

Culture, expenses and produce of a field, the foil a loose woodcock loam, as before. 1767.

The tare-stubble was plowed up in November, and the land water-furrowed. This piece was equally manured with twelve loads of compost, consisting of equal parts of farm-yard dung and virgin mould; then plowed and sowed one half on common three feet ridges, turning in two pecks of tick-beans with the manure, and the other five feet ridges arched and drilled with a peck and an half of the same beans, in treble rows on each ridge, one foot as funder. The treatment of each, much the same as is customary; the tops of both were cut as soon as they began to blossom. Produce of the broad-cast, seven bushels: of the drilled, ten bushels and two pecks. Proportions per acre,

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This Thews that the superiority of the new hufbandry will be apparent, when the land in both cases is well manured. The broad-cast does not profit more by the dung than the drilled; on the contrary, the latter exceeds the former as much when the land is well manured, as when it is not, which is remarkable, as the broad-cast crop stands more equally over the whole furface, and is, confequently, better adapted, in appearance, to draw the nourishment from the manure. But as the contrary is absolutely the fact, it proves that the operations of horse-hoeing enable the roots of the beans easily to extend into the loose mould in the intervals, and to draw all the nourishment from thence, as well as if the plants were there scattered; for the plough in horse-hoeing four times, throws all the loofe earth of the intervals twice against the rows, and as it at each time falls into the furrow that has been fometimes open, of course it lies in a loose and mellow manner for the roots to penetrate properly into it.

On a general survey of experiments carried much further than the foregoing, it appears that the face of the matter is not altered, but still bears the same complexion with regard to the different modes of sowing above-mentioned. In a course of no less than nine experiments, the drilled beans have been found, after the payment of all expences, to be superior to the broad-cast by full two pounds, three shillings, per acre, besides the difference of the land's being left in so much better heart by the latter than by the former, as has before been particu-

larly noticed.

These then (as Mr. Young observes) are objects of no trisling nature, and ought therefore to induce even common farmers to practise, in this case, a husbandry which repeated trials prove uniformly to be so much superior to the common practice.

practice; but as husbandmen are generally too well known to adhere so closely to their old custom, that much cannot be expected from them; it is therefore from gentlemen that we must look for an exertion, to introduce a method which will indubitably prove fo greatly advantageous as to fecure them a moral certainty of fuccess. And it is that fuccess alone which will have any power over husbandmen. The fuperiority of the drill culture, as a preparation for wheat or barley, I do not think can be estimated at less than fifteen shillings an acre; -here is a fuperiority of near three pounds an acre, in favour of drilling. Is it not evident, that this in a large piece of ground of clay, or loam, will amount to some hundreds of pounds per annum? Three hundred pounds upon an hundred acres is a matter of great importance. Nor should it be thought, that the great advantages attending this culture of beans, are any novelty. Drilling beans is, indeed, the common mode of husbandry practised in Kent, and adopted in Essex, and in a great measure in the clayey parts of Norfolk; so that this shews this method has been found by many husbandmen much superior to the common practice, or fo many common farmers would not have quitted the latter in its favour—so that this part of the new husbandry cannot properly be termed a novelty, as being the practice of many common farmers in certain parts of this kingdom. Certain it is, that the common farmers, however, in this their choice of a crop for drilling, have shewn no bad judgment. Wheat has been proved to have had but very indifferent success; barley, oats, and peafe, (the former especially) have proved very bad, but beans much superior to the common mode. Now this being the only fort of corn or pulse thus commonly cultivated by farmers, gives one reafon to think (did not experiment prove it) that

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its nature is much more adapted to this culture

than any of those crops."

As to the quantity of feed requisite, the abovementioned gentleman is of opinion, that this is a matter of little consequence, as the number of beans does not depend fo much on the quantity of feed, as on the hand-hoes cutting up many or few of them; which is much the fame as in turnips, whether a pint or a gallon be fown, the increase being much the fame, the workmen fetting them out at proper distances, without regarding the number of the plants.

With regard to the time of fowing, some delay it through choice till the end of March, and others even till April; whilft, on the other hand, there are those who will not put their feed into the ground after February. Nay, some sow with the first favourable season after, and others before

Christmas.

After various trials made as to the feed-time, Mr. Young (whose authority his indefatigable pains in afcertaining points of practical agriculture may well establish) determines, that the end of January to the beginning of March will be the

best periods for sowing beans.

"The superiority of February, the end of January, and the beginning of March (fays he) is eafily to be accounted for. It appears to be requifite to this crop, that the beans be fown fo late in the winter as not to fuffer a long pressure of the earth upon them. When fown in November or December, they lie nearly as long in the ground before they shoot out, as when sown in February, during which extra time the earth upon them fubfides, and falls fo close, that the young roots have not the power to strike, which they possess when the furrounding earth has not been to long in fettling by a month or two. And, on the other hand, Z 2

February

February is early enough to prevent all danger of dry weather's coming before the beans are strongly rooted, which so often proves the ruin of two treble sown crops. Nothing can be clearer, than the necessity of the farmers getting their bean-seed into the ground by the middle of March, the latter end of that month and the beginning of April producing a comparatively poor crop, whatever precautions may be taken to enlarge it."

C H A P. XII.

Of the Culture and Management of Vetches;—the Manner of raising and preserving them.

THE botanists distinguish several sorts of vetches; but as most of these distinctions can convey but little instruction to the farmer, we shall purposely avoid entering into them as being only

tedious and perplexing.

There are some forts of this plant, the seeds of which ripen in autumn, that grow naturally in shady places in most parts of this kingdom. The roots of these are perennial, but their stalks are annual, weak, and grow to fo great a length, (rifing to the height of fix or eight feet, wherever the tendrils which proceed from the ends of their leaves can lay hold of boughs, branches, or the fide of a hedge) that people generally think them scarcely fit to be cultivated in the field, though fome writers have recommended them for this purpose; for as they meet with no support there, they will be apt to trail fo much upon the ground as to rot, nor do their shoots, which are less succulent than those of the vetch commonly raised, grow to a fufficient height to be cut for use till it

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is late in the spring, when there is but little want of green food for the cattle, a circumstance which

tends greatly to leffen their value.

After fowing the common tare, which is cultivated in the fields for fodder, for many years, Mr. Miller is of opinion, that that which has black feeds is a diffinct species from the white, as he has never found either of them to vary. Both these are annual, and perish soon after they have perfected their feed. Their stalks are angular, streaked, and hairy; they are weak, and want support, and generally trail upon the ground, when they do not find any thing to fasten themselves to. Their leaves are composed of several pairs of blunt lobes, and are terminated by tendrils. The flowers which are pretty large, proceed from the wings of the stalks, and fit pretty close to the base of the footstalks of the leaves. Two of these slowers generally spring from the same joint. Those of the black-feeded fort are purple, and those of the white-feeded are white. They appear in June and July, and are fucceeded by erect pods containing three or four round feeds in each, which ripen in August and September.

The more fucculent plant of the two is reckoned to be the white vetch, and this therefore is also generally accounted to be the better for the fodder of cattle. But there is one reason why many farmers are very unwilling to cultivate this sort, and that is no other than because their seeds being white, are likely to be much sooner discovered by the rooks and other birds, than those whose blackness causes them more nearly to resemble the ground that they grow upon. Yet there is one method recommended of removing this inconvenience, which is, that of sowing them according to the drill husbandry, and then covering them carefully, instead of the usual method of scattering them in

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broad-cast, and plowing them in lightly. This is proposed as a security against those winged enemies.

But the small black-seeded and rath-ripe vetch, which is also called by some the pebble, or summer vetch, is more tender than the former, and for that reason it is less cultivated. The spring is always the time for sowing this, whereas either in spring or autumn it is customary to sow the other.

There is (fays my author) another species of vetch, viz. the Siberian, which is little known to the farmers of this country, and yet bids fair to become the most useful of all fodder; for its stalks grow to a great length, and are well fornished with leaves, which do not decay in autumn, like those of the other forts, but continue green all the winter, notwithstanding the hardest frost; so that in February and March, when there is often a fcarcity of green fodder for ewes and lambs, this may prove of fingular service; especially if these plants are supported from trailing upon the ground. Their flowers, which appear in July, are of a light, blue colour. This, like our common vetch, may be fown in the spring or in autumn; and when the plants are come up, they will not require any other culture than keeping them clear from weeds, a work which, if the feeds are fown thin, in rows four feet asunder, may be done with the Dutch hoe while they are young, and afterwards with the hoeing plough. By this thin fowing the stalks of these vetches which send out many branches, and extend very far, will be kept from matting fo closely together as to rot each other by excluding the air; and by catching up their stems in the same manner as should be done with pease and beans, they will be greatly strengthened, their leaves will grow the longer and more succulent, and they will consequently yield an increased quantity of fodder. The

The repetition of this as often as it shall be found necessary to destroy the weeds in summer, which may be done at a very small expence, and is particularly proper when the growth is intended for the green food of cattle, will be attended with the farther important advantage of preparing the ground thoroughly for whatever other crop may afterwards be put upon it. As the plants of this kind of vetch will not be in danger of being hurt by frost, they should not be cut till spring, when the best way will be to take them just as they may be wanted, green, for the feeding of ewes; but some of them should be left untouched for feed; for if those which are cut do shoot out again, they will flower to late in the fummer, that their feeds will not ripen unless the autumn proves very warm. It is therefore better to fow a proper quantity of feeds for this purpose in a separate spot of ground, because when the other is cut, the ground may be plowed for other crops; and if the feafon should be so mild as to produce a sufficiency of green food independant of this, the vetches may be plowed into the ground, to which they will be an excellent. dreffing to fit them for other crops that may come after.

We are informed that Mr. Miller has tried experiments upon this kind of vetch for fix years past, on small patches of it, sown in a garden in different situations, all of which have fully answered his expectations; he expressed his intention of trying them in the field, which will not fail of answering a good end, by the use that may be made of such experiments as it is probable he will hereafter publish.

The time which is reckoned the best for sowing vetches in general, is toward the beginning of August, because the rains which usually fall about that season will bring them up in a short time, and

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the plants will get strength before winter, and be fit to cut for the food of cattle early in the spring, when green fodder is most wanted. If they are designed for seed only, these early sown vetches will come early into slower, and their seeds will ripen early, so that they may be cut and stacked in good weather, which is of great advantage, because the late ripened ones are often stacked or housed wet, and then their seeds are spoiled by sprouting in the mow.

It is reckoned that vetches will do well almost on any ground, even fuch as will scarcely produce any other plant. It is common to fow in broadcast, plowing them in very slightly, as has been before observed, and two bushels of seed to an acre is, in this case, the usual allowance, though some allow half a bushel more. " Either of these practices (fays my author) may do well enough for those vetches which are intended to be cut for fodder in the fpring; but when they are fown with a defign to let them stand for feed, it will certainly be much better to fow them in drills; and, in that case, less than half the above-mentioned quantity of feed will prove sufficient; for the rows should be at least three feet afunder, that the hoe-plough may have room to go between them, to destroy the weeds, and to earth up the plants, which, when thus managed, will produce a greater crop, and open better and more eafily than in the common way. The drills should be about the same depth with those which are used for pease, and the seeds should be scattered at about the same distance in the drills, in which they should be carefully covered over as foon as they are fown, left the rooks should discover it; for when these voracious creatures once find the rows, they will speedily destroy them entirely, if they are not carefully watched. The prevention of this, is another advantage which attends

tends the fowing of vetches early in autumn rather than in the spring, because there is more food for the rooks in the open fields in that feafon, and the plants will appear above the ground much fooner. About the end of October, by which time they will have acquired much strength, the horse-hoeing between the rows should be begun, in case the weather should prove dry; and in doing this, particular care should be taken to lay the earth up as high to the stems of the plants as can possibly be without covering their tops. This will help to fecure them against frost, and clear the ground of weeds, at least till March, when the plants should be earthed up a second time, and the intermediate spaces between their rows be cleaned again, in the fame manner as before. This will make them grow fo vigorously, that they will meet and cover those spaces in a little time; whereas those fown in the spring will not grow to half this fize, and will be very late in flowering.—When vetches are intended only for fodder, of which they generally afford two good crops in the year in hot countries, or when the farmers design them for plowing in, by way of manure, they need not be fown in drills, or husbanded in the manner above directed, the common broad-cast way will then do well enough; but still it is most adviseable in either case to sow them early in the autumn, because, in the first place, they will produce the defired green fodder much the earlier in the spring; and in the fecond, they will be fit to plow in much fooner the following year, and thereby have time to meliorate the land, and prepare it to receive the enfuing crop, which they are generally allowed to do more effectually than peafe. It is generally reckoned, that stiff clays are peculiarly benefitted by this dreffing; but yet it is but bad husbandry to fow vetches for green fodder where lucerne will thrive,

thrive, because this last will yield greater plenty of

ftill more nourishing food.

In some countries they mix oats with their vetches, an equal quantity of each, and sow them in the month of February; and the vetch, supported in some measure by the oat, generally grows the higher for it.

Of LENTILS.

LENTILS are mentioned by Mr. Liste as a common culture; but it is the opinion of some farmers, that the chief profit to be expected from them, is, that of raising them as fodder for cattle, in which respect they have been deemed preferable to hay. I shall only recite here a few trials made upon them, with the result that arose from those experiments.

"EXPERIMENT I.

Culture, expence and produce of part of a field, the foil a gravelly loam. 1765.

In 1764, this piece yielded barley, the stubble of which was plowed up in November. It was stirred again in March, and harrowed in half a peck of lentils. They came up favourably, and were mowed in the beginning of July for hay. Produce dry, one hundred weight and an half. Proportions per acre.

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This was the best crop obtained, and the most in favour of those farmers who wish to raise all kinds of food for cattle. The appearance of the hay is finer than that of the tares—the cattle, however, did not prefer it, and whatever its quality might be in quantity, it was inserior.

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"EXPERIMENT II:

Culture, expences and produce of a second field, the foil nearly similar. 1766.

This piece yielded oats in the year 1765. Plowed up the stubble in October, and harrowed it again in the middle of March; after which half a peck of lentils were harrowed in. The crop was mowed for hay the last week in July. Produce one hundred weight and a quarter. Proportions per acre.

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Harrowing	. 0	0	2
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Mowing	. 0	I	3
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The profit by the above trial was but trifling, which is owing to the smallness of the produce. The quality of the hay seemed to be on a par with the tares.

"EXPERIMENT III.

Culture, expences and produce of twenty perches of a third field. 1766.

This piece formed a broad-way bed, adjoining to one which was fown with tares; the culture of both was the same. The stubble was plowed up in October. In March stirred it again, and one peck of lentils were harrowed in. They were once thistled and mown for hay with the tares. Product of the former three hundred weight and one quarter. Proportions per acre

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Harrowing -	0 0 101
Carting	0 0 10
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Clear profit -	0 15 5

The tares paid 21.6s. 3d. clear profit; but these lentils amounted to only a third part of that sum. The result is, that, according to these experiments, tares are preserable to them, and that where the land will produce these, the lentils, after all that can be said in their savour, will generally prove unprofitable.

C H A P. XIV.

Of TURNIPS.

HE turnip is certainly a root, the culture of which ought greatly to be attended to, as it will ferve for food to nourish both men and cattle, and it has, on these accounts, been much esteemed by the ancients.

The turnips which are most profitable for the food of cattle, which is here our chief object of consideration, are the red or purple topped, and the green topped turnips. As they are only varieties of the same sort, the roots of both grow generally to an equally large size; but those of the latter sort longest continue good. The long-rooted, the blackish, and the yellow turnip, are now rarely cultivated in England. The Dutch and French turnips are of a good taste while they are young; but when

they grow to their full fize, become rank and ftringy, and confequently are not proper for cattle.

Those which are distinguished by the name of the green topped turnips, which are the whitest and the sweetest tasted, grow more above ground than any other fort of this plant, and therefore are, besides being the best in other respects, the most convenient for the food of cattle. They are however more exposed to the injuries of frost, a sudden thaw, after which is very apt to rot them. Mr. Miller has known some of this kind of turnips to be boiled, which, though above a foot in diameter, proved as sweet and tender as any of the smallest roots.

It is in general observed, that turnips thrive best on a light sandy loam, and deep soil. If it be moist, however, they will grow the better in summer, especially upon fresh land, where they are sound sweeter than upon an old worn out soil. The land for turnips ought to be well manured, and in the sinest degree of tilth. If it be not in so good order as might be wished, it is then recommended to be laid up in ridges for the winter, in order to be mellowed by the frost, and by repeated plowings and harrowings, be brought to its proper state before the beginning of summer.

From the beginning of June to the middle of August, is generally considered as the best time for sowing of turnips. The seed must be harrowed in as soon as it is sown, and the ground rolled with a wooden roller, to break the clods, and make the surface even. One pound of seed, where the ground is sown broad-cast, is commonly reckoned sufficient, though others sow two pounds. Four ounces, however, is the quantity generally used in the drill

husbandry.

An open spot of ground is recommended for turnips, lest, if they are planted near hedges or walls.

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walls, they should draw up, and be very long topped, without their roots growing to a proper fize. When the fly, which is a great enemy to this plant, has eaten off the crop, so as to make it not worth the farmer's while to hazard the profit of it, M. du Hamel advises to plow up the fields, and sow it with vetches for green fodder, or else to leave it till autumn, and then give it a plowing, and sow it with wheat.

It is the opinion of Mr. Lise, that the best way to manage turnips (the feed of which, he fays, is impatient of growth, and apt to burst in too much wet, as also to corrupt, if the ground is so dry as only to give it a damp, but not wet enough to fet it on growing) is first to harrow the ground fine after it has been brought to a proper tilth by plowing, and then to roll it, to break the little clods, if any remain, and fo to let it lie till the next rain, then the ground being mellow, to fow the feed, and harrow it with short tined harrows; then to repeat that operation with a one-horfe roller, in order to keep the moisture in the ground as deep as the feed may lie. He conceives the fuccess or miscarriage of a crop of turnips to depend on four things: first, in the feed not lying too deep; fecondly, in its not lying too wet, which it cannot eafily do, if removed in fallow, the furface of the earth being foon dry; thirdly, in its not being too dry; and, fourthly, in its lying in a fine bed.

When the feed grows, the plants will generally appear within a few days, if the feason be moist; but they must be expected to be longer in coming up in dry weather, and it is from this that they will be in the greatest danger from the fly. When they have got four or five leaves, they should be hoed, in order to destroy the weeds, and to thin those plants which grow too close together, leaving the remaining rows about six or eight inches asunder, which will

will be room enough for the plants to stand for the first hoeing. It is directed by the same author, at the fecond hoeing, to cut up the plants, which will run to about the fize of apples, ordering it fo, that they may stand fourteen or sixteen inches from each other whenever they are defigned for cattle, observing, that in this case whatever is lost in the number will be gained in the bulk of the plants. But as large roots are not so much esteemed for the table, when they are fown for the use of the kitchen, the space of ten inches will be sufficient. After these two hoeings, instead of the first, of which M. du Hamel advises a flight plowing all over the field with a plow that has no fins to the share, the turnips will not require any farther care. They will have attained their full fize in October, before the frosts comes, and should then be taken up, stripped of their leaves, which may be given to cattle, and laid upon hurdles in a dry place, with a layer of dry fand between each layer of the roots, which may be thus piled up, and will keep very well in this condition during the winter.

The best season for hoeing turnips is a dry one, because neither these nor the weeds will then be so apt to grow again. An easy way prescribed to have two growths of turnips in the field, is to sow seed of the last gathering, and seed that is two years old; for this last is longer before it rises than the new; and one advantage attending the method is, that the turnips, by rising at different times, will have the chance of escaping the fly, or grub, which

fometimes deftroys them entirely.

Mr. Liste informs us, that the worms to which turnips are liable, may be guarded against, in a great measure, by stirring the ground. This, he says, will also render them much sweeter, and it is likely that unstacked lime will also preserve them from the sly. It is to the worm lodged in the root

of the turnip, that Mr. Lise imputes the distemper, which the farmers call the hanbery, so named from a distemper that resembles it in a horse's heel. It is a watery excrescence, formed probably by this insect, in the manner that galls are formed upon the oak. In some years, it takes off whole crops, and the turnips are never thought to thrive after it

has made its appearance.

Turnips are chiefly serviceable for feeding cattle in the winter and spring, when there is a want of grass for their pasture. Cows, oxen, and hogs, are very fond of this food, and it generally encreases the milk of the former. Some make a practice of turning a flock of sheep at random into a large field of turnips, where they generally spoil in a little time what might keep them much longer.—
The following methods have therefore been advised, to remedy this inconvenience:

The first is that of portioning out the turnipground with hurdles, for every separate day's food of the sheep; yet in this method generally something remains in the ground, which at best must be esteemed as useless for the end for which it was

intended.

The fecond method prescribes the pulling up turnips as soon as they are hurdled off, before the sheep are turned in. They then eat them better, because the food is in good condition. And in this case the turnips which are next to the hurdles, should be thrown towards the middle of the little inclosure, because they will be less liable to be trampled upon there, than at the boundaries of it, where the sheep are apt to run about most in search of means to escape into the open field from the place of their confinement.

Pulling the turnips up, and carrying them into another ground, is the third way, spreading them every day upon a new place, till the sheep eat them

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up clean. This is done when there is land at a small distance which has more need of dung than that on which they grow. The expence of the carriage is generally reckoned to be compensated by saving the price, or at least the carriage and removal of the hurdles; but when the turnips are laid upon a spot of grass, as is frequent in wet weather, the benefit of the dung and urine of the

sheep is lost to the farmer.

When the field whereon the turnips grow is cut, this method is requisite. 1. Because the sheep would trample upon and bury part of the roots, which would be lost. 2. In treading the wet earth they would peach it, and render it unsit for corn. 3. Because (as has been observed above) by this method a field may be dunged which wants it more than that where the turnips grew. 4. This must necessarily be done if wheat has been sown in the alleys between the rows of turnips, according to the principles of the new husbandry.

If turnips are intended to fatten the larger cattle, they are always carried off the field, and it is proper to cut them in pieces, left the beatts should choak themselves. These are generally given morning and evening to stall-fed bullocks, which also eat common food in the intervals; but the turnips are said to increase their appetite so much, that a middling sized bullock, stalled for sattening, will consume near two hundred pounds weight of them in twenty-four hours, besides hay. And by this method a healthy bullock may be sattened it three

months time.

Mr. Young, who tried the different modes of fattening sheep with them, and of drawing them for larger cattle, on the result of his experiment, concludes thus:

farmers, who have it in their power to chuse be-

tween those two methods of consuming their crops, to determine in favour of drawing them, and at the same time to allow the beasts fatted, or kept upon them, as much litter as they will make into dung. This is absolutely necessary. They may depend on the great profit attending this conduct, and on its being superior to that of feeding off with sheep."

There are various ways recommended by different persons for cultivating this root. The author, whose work now lies before me, gives us the fol-

A CHILD DOLL IN

lowing observation:

"Some intelligent farmers (fays he) have of late cultivated turnips, by fowing the feed in rows with a drill plough. The distance between the rows has been different, according as their judgment has fuggested, from having placed them three, some to four, five, or fix feet afunder, and some having sown the rows double, whilft others were well pleased to have fingle ones. These last, with intervals of fix feet between the rows, have been recommended as the best; and though the intermediate spaces may appear very wide, yet the crop produced on an acre of land, fown in this manner, has been greater than upon the fame extent of ground where the rows have been only at half the distance. Certain it is, that the field in which turnips have been drilled with the horse-hoe, have constantly yielded much larger crops than those which have been fown in the common broad-cast way, and only hoed."

He adds, "the late Lord Viscount Townsend was at the expence of making the trial of these two different methods, by dividing the corn field equally with different portions, which were sown alternately in drills, and the intermediate ones in broad-cast. The latter were hand-hoed, the former cultivated with the hoeing plough. When the roots were full grown, his Lordship ordered an equal quantity of land cultivated in each way to be measured,

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and the turnips to be drawn up, and weighed, when those cultivated by the plough were so much larger than the others, that the crop of one acre of the former weighed a ton and a half more than that of the same extent of ground, which was sown broad-cast. As the above-mentioned experiment depends not merely upon the size of a single turnip, but on the produce of a whole crop; and as a gentleman, who has made many trials of both modes, and who is generally inclined to savour the common way of sowing, is here at last confessedly in doubt, we shall not scruple, upon the whole, to give the preference in the culture of turnips to the horse-hoeing husbandry.

C H A P. XV.

Of POTATOES.

IT is faid that this root was first brought from Virginia to Ireland, where Sir Walter Raleigh stopped first, distributed potatoes among the inhabitants. These were of excellent service when the wars in that country afterwards destroyed the corn, and inded grew in such a manner, that it was almost impossible, by digging up, or even sisting the ground, to extricate them. From Ireland roots of them were first brought to Lancashire, and for some time were not in any esteem among the rich, though the quantity which is cultivated now in England, especially round London, shews how much people have altered their opinions.

The red-rooted potatoes bear purplish flowers; but white ones are found upon those whose root is of a white cast. The potatoe seldom perfects its A a 3

feeds in England, but is propagated from its roots,

which is a better and a fafer way.

Switzer, in his Practical Kitchen Garden, fays, "The Irish husbandman, after blaming the English for planting this root uncut, because it often contains five or fix eyes, or more, from which the produce of the ensuing year is to spring, as also for not allowing the bulbs a space of earth sufficient for their nourishment, which is the reason why so many unserviceable potatoes are dug up in autumn, relates the practice of the Irish, which is, to chuse middle sized roots, to single out the eyes that are strongest, and to cut them out in squares, at least half an inch every way, so that one root will some times surnish three or four good pieces to set.

"The ground prepared for planting is marked out in beds four or five feet wide, with intermediate alleys of two or three feet. It is then trenched only a fingle spit deep, and the bottom of this trench made up in common garden trenching, is covered with dung, long and short, taken out of a wheel-barrow, which stands at the labourer's elbow; the potatoe eyes are cut as before directed, and placed upon this dung, about five or six inches asunder; and this trench is filled up with the mould taken out of the next, marked by a line at the distance of two or three feet. That trench is again filled with the mould of the next, and so on

to the last, which is filled from the alley.

The use of the dung thus laid at the bottom of the trenches, is not only to make the roots grow single, for not above one or two at most will be produced by the eye, but it is attended with the farther advantage of making the potatoes run, and spread themselves to a certain determinate depth, which is no small help to their growing large.

Being planted in February or March, the last thing to be done to them in April or May, is to

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dig the earth out of the alleys, as it is done for afparagus, and to cover the potatoe-bed with it about five or fix inches thick. This will give new life and vigour to the roots, will keep the green from running too much to haulm, and make the bulbs grow much the longer. By these means the crop of fine, large potatoes, will be almost double what is obtained when they are planted promiscuously in the common way, nor will any farther culture be requisite till they are fit to be dug up, except the pulling out the largest weeds.

Mr. Miller, however, disapproves the cutting the eyes out of the larger roots, or the planting the smaller off-sets entire: but M. du Hamel does

not at all object to planting the cuttings.

It is generally observed, that this plant thrives best in a light, sandy loam, neither too dry, nor over moist, but brought to a fine tilth, and plowed very deep, as the deeper the earth is loolened, the finer and larger the roots will grow. Mr. Miller says, that in the spring before the last plowing, a good quantity of rotten dung should be spread upon the ground, and plowed in early in March, if the season be mild; otherwise it is better deferred till the middle, or the latter end of that month; because if a hard frost should come on soon after the roots are planted, they may be greatly injured, if not destroyed by it.

The ground should be laid even by the last plowing, and then furrows should be drawn three feet as under, and seven or eight inches deep. At the bottom of these furrows the roots should be laid, and then covered with earth, about a foot

and an half afunder.

The ground thus planted, is to remain in the fame state till nearly the time when their shoots are expected to appear, then it should be well harrowed both ways, as well to loosen the surface and

which will have begun to grow by that time.

"I have placed the rows at three feet distance, (says Mr. Miller) in order to introduce the hoe-plough between them, because that will greatly improve their roots; since by twice stirring and breaking the ground between these plants, not only weeds will be destroyed, but the soil so loosened, that every shower of rain will penetrate to their roots, and greatly quicken their growth; but these operations should be performed early in the season, before the stems or branches begin to fall,

for fear of injuring the shoots.

These horse-hoeings being carefully performed will prevent the growth of weeds, till the haulms of the plants cover the ground, when these last will keep them under. The potatoes will then be ready to be taken up very foon after the first frost in autumn; nor should they remain much longer in the earth, left the roots themselves should be frost-bitten, which spoils them. A four or five pronged fork is better to dig them up with than a fpade, because it is less apt to cut them; but a principal thing to be confidered here, is, the clearing the ground of them; for if any are left, they will shoot up with the next crop whatever it be, and do considerable damage, especially if it be wheat, as is generally the case, sown in the common broadcast way.

To keep these roots, is that of laying them up in a dry place in very dry sand, or in fine and

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perfectly dry earth.

It is generally agreed on all hands, that potatoes are of such a nature as to be best adapted for the horse-hoeing husbandry. Jerusalem artichokes are likewise recommended as very profitable to the farmer, especially for the feeding of swine; the

crop is large, and the profit great, which are circumstances of great consequence to the farmer.

C H A P. XVI.

Of CABBAGES.

THE common curled colewort and borecole, and the perennial colewort, are the species of cabbages most commonly cultivated here, and most proper for the food of catrle. The refuse leaves of all the other sorts of this plant generally do well for them; but these are the best for raising in the field, because they are the hardiest, most able to resist frost, and therefore sittest to yield green food in

the fpring.

They are recommended to be treated in the mode of the new husbandry, and to be fown about the beginning of July. When the cabbages have got five or fix leaves they should be hoed and thinned, in order to let them have full room for spreading in the rows, which must be sufficient to admit the working of a hoe-plough; and the hoeing should be performed in dry weather, in order the better to kill the weeds. Within about fix weeks, the plants should have a second hoeing with the horse-hoe in the alleys, and by handhoeing between the cabbages in the rows. If this is carefully performed likewise in dry weather, the ground will be thoroughly cleaned, and the plants will require no farther culture. In spring they may either be drawn off, or the cattle turned in to feed upon them as they fland; but the former is the method that is generally found preferable.

As the fly and the caterpillar are equally enemies to cabbages and turnips, all possible care should

be taken to avoid or destroy these in the culture of both of them; but of all the means hitherto tried to bring about so desireable an end, none has yet been found better than fine tillage, keeping the land free from weeds, and frequently stirring it.

Nine pounds of feed are allowed by Mr. Miller to one acre of land; probably, according to the common method of fowing it. According to the new husbandry, it feems that a much less quantity will prove sufficient. Cabbage seed is so cheap, that the price of it is an object of small concern, but the rows may be too much crowded; and as the new husbandry is generally adopted for this plant, it follows that that circumstance will be

regarded as an evil.

The best method of saving the seeds of cabbages, is to single out the finest plants, to dig these up about the end of November, and then to carry them to a shed, and hang them up by their stalks for three or four days, that the wet may drain from them, and then to replant them in a border of fine, loosened mould, under a hedge, so deep as to leave only the upper part of the cabbage itself above ground, and even they should be earthed up almost to its top, unless the earth be wet. In this last case, indeed, the whole head of the cabbage, for fear of its rotting, should stand pretty much above the ground.

Straw, or the haulm of peafe, should be spread lightly upon those cabbages if the winter proves hard; but it must always be removed in mild weather, lest they should rot by being kept too close. Thus ordered, they will shoot out strongly in the spring of the year, dividing into many small branches, the principal of which must then be supported, to prevent their breaking off with the wind; and if the weather prove hot and dry, they

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should likewise be refreshed with water once in a week.

It will be right to cut off the top of every shoot with the pods upon it, when they begin to turn brown, to strengthen the remaining seeds: when these begin to ripen, great care must be taken that the birds do not destroy them. Nets have sometimes been inessectional for this purpose, Mr. Miller therefore advises the use of bird-lime, adding, that when the birds thus caught, being unable to extricate themselves, remain on the twigs, it will so terrify the rest, that it will be a long time before they venture to the same place again.

The feeds, when they are fully ripe, must be cut off, dried, threshed out of their pods, and then

laid up in bags for use.

It is to be remarked, that partridges, pheasants, and turkeys, in particular, are so fond of cabbages, that if there be any of them in the neighbourhood they will flock to them, and lie constantly among them, unless proper care be taken to prevent them. That fort, which some distinguish by the name of the turnip-cabbage, is preferred by Mr. Young in point of culture, profit, &c. to all the rest.

C H A P. XVII.

Of CARROTS, PARSNIPS, and PARSLEY.

THE cattle among the Flemings have long been known to be fed with carrots to advantage; though it is but of late years that this practice has been adopted in England, yet it is found to be the most heartening food for cattle, and therefore well merits the husbandman's attention. Mr. Miller says, that one acre of carrots well planted, will fatten a

greater

greater number of bullocks, or sheep, than even three acres of turnips, and that their flesh likewise will be firmer and better tafted. It is certain that horses are very fond of this food, and there is scarcely found any better for hogs. In hard winters they have been found of great service to deer in parks, which must otherwise have perished; nor are they so likely to fail as turnips, one reason of which is, carrots come up fo well, that unless the months of June and July are very unfavourable, there is little doubt of their fuccess; whereas, at their first coming up, turneps are very liable to be destroyed by the fly or the caterpillar, which sometimes lay waste whole fields at once. Every farmer, who has a large stock of cattle, should therefore take care to have a good store of the former, as they will prove in every respect most advantageous.

For carrots, and for all tap-rooted plants, the ground should be plowed as deep as the nature of the soil will admit of, and brought to as fine a

tilth as possible.

A pound and an half of feed will generally be fufficient for an acre; but the feeds of this root are so apt to cling together, that it proves difficult to sow them. To mix a quantity of dry sand with them, and to rub the whole well together, seems to be the best method of separation. After they are sown, they must be lightly harrowed in, and when the plants are come up, must be hoed and stirred so as to be left ten inches as funder. The hoeings must be frequently repeated to clear them from weeds, and no other crops should be sown with them, if it be intended that they should have large roots sit for fodder.

PARSNIPS, which are found to be in a great measure of the same nature, and to require the fame fort of cultivation, are also found to be a very wholesome and nourishing food for cattle; but they seldom grow after they are above a year old. After all, it is generally found that where the cattle have their choice of both kinds of food, they are found to prefer carrots.

PARSLEY is accounted an excellent preservative against the rot in sheep, if they are fed with it twice a week for two or three hours each time. It is probable also, that as well as among the abovementioned disorder, the taste of the mutton might

be improved by this food.

The best time of sowing parsley in the field is about the middle of February, and the ground cannot possibly be in too fine tilth for it. Two bushels of seed have been recommended for an acre of land sown in drills, about a foot asunder, leaving space enough for hand hoes; and rabbits are so fond of this vegetable, that they will come from a considerable distance to feed upon it; so that whoever wishes to have plenty of these animals in his fields, needs only to stock them with it; but at the same time he should take care to have his parsley well fenced in, or they will certainly totally destroy it.

Where the land will not yield good crops of carrots or parsnips, the culture of red beets will

generally be found profitable.

C H A P. XVIII.

Of GRASSES; — Clover, Sainfoine, Lucerne, and Burnet.

CLOVER is the first of these different sorts of artificial Grasses, as they are generally called, that we shall here treat of. There are many sorts of

this plant enumerated, but the distinction of those generally cultivated in England, are reduced to the red, or Dutch clover, the white meadow trefoil, suckle grass, or white Dutch clover, and the

yellow meadow trefoil, or hop clover.

The red clover is a biennial plant, whose roots, after they have produced seeds, decay. The usual allowance of seed for an acre of ground is ten pounds in the common husbandry. In the choice of seeds, the bright, yellow coloured is preferable; the palest fort should be rejected.

In England, clover is generally fown with barley in the spring; and when the barley is taken off from the ground, the clover spreads and covers it, where it remains two years, after which the land is plowed again for corn, and is generally found to

be greatly enriched by the clover.

It is advised by Mr. Miller, who has made many years trial, to sow the clover-seed in August, when

there is a prospect of rain soon after.

The feeds of clover being liable to be fcorched and killed if fown in hot weather, it is adviseable that they should be but barely covered. It would be best also to steep them before they are sown, and to dry them with chalk finely powdered.

This kind of grass will be fit to cut about the middle of May, when care must be taken in making it into hay, as it will require more labour and more time to dry than common grass, and will shrink into less compass; but if it be not too rank will make excellent food for cattle. It should be cut when it begins to flower, and care should be taken not to stack it till it is thoroughly dry, for fear of its heating in the stack.

It is reckoned that one acre of clover will feed as many cattle as five acres of common grass; but they must feed on it in moderation, lest it should burst them. Rye-grass is therefore sown by some

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farmers to prevent this, though it is questionable whether the latter's impoverishing the ground is not a greater disadvantage.

Milch cows should chiefly be prevented from eating greedily of this plant; but when it is dry, it is not nearly so hurtful to any fort of cattle as

while it is green.

It is the opinion of Mr. Maxwell, that fowing clover with barley or oats will prove advantageous, because being weak and tender the first year, it might otherwise be overcome by weeds, which, in this case, the corn would keep down, whilst at the same time the stems being at a sufficient distance to admit air to the clover, would also protect it from drought. The stubble proving a further protection after the corn is cut down, and manuring the ground, when at last it rots upon it.

It sometimes happens when clover grows luxuriantly for the first year, that the farmer suffers it for the next also; the second crop then is frequently suffered to run to seed. In such case, as all plants running to seed impoverish the ground greatly, the land on which the clover has seeded, in order to prepare it for a spring crop, should be

laid up rough during the winter.

A rich crop of wheat is not to be expected where clover has stood three years, without losing a crop of some other grain by a summer fallow; because the ground, though in the finest tilth when the barley was sown, will be grown hard and stiff by that time, and abound with the roots of weeds, which will have prevailed as the clover died away. The clover, to prevent this inconvenience, should rather be plowed up after one crop. The method of drilling and hoeing between the rows, is generally recommended for promoting the growth of clover; though some late writers say, they have found it succeed best in broad-cast.

SAINFOIN

SAINFOIN is a very fruitful kind of grass, and when cultivated according to the new husbandry, its stalks have been known to grow to nearly the length of five feet. The great fruitfulness of this plant is owing to the vast quantity of its roots. Its top root sometimes pierces sisteen or twenty feet into the earth, and sends forth many lateral branches. On this account, some have thought that sainfoin will not succeed except there be a bed of gravel, &c. to stoop its roots. It rather appears, that the deeper they strike, the plant is the more flourishing.

This plant, however, should not be sown above half an inch deep in stiff lands, because the heads of its seeds are so large, and the necks so weak, that the mould is apt to interrupt them where they

lie deeper.

Barley, oats, &c. are often fown with it, which remaining but a short time on the earth, are not likely to damage it. In dry years it happens sometimes, that when these are mown, no sainfoin is seen; but on examination, certain white threads are generally perceived, which indicates that the sainfoin has sprouted, and shot its small leaves, which have been cut off by the scythe.

Mr. Tull, from various experiments made upon

this grafs, draws the following conclusions:

"I. That when fainfoin is fown to be cultivated with the horse-hoe, the best way is to sow it in two parallel rows, eight inches distant from each other, and to make the alleys forty inches distant from each other; so that from the middle of one furrow to the middle of another, should be four seet.

2. Where the fainfoin is fown only with an intention to hand-hoe it, the space between the rows should be sixteen inches, and the plants in the rows should be eight inches as funder.

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3. When fainfoin is fown without any defign to hoe it, the best way is to drill the rows eight inches asunder, with no greater quantity of seed than when they are at sixteen inches distance.

It is observed also, "That sainsoin thrives best in a rich, dry, and light soil, especially where there is a bed of gravel, chalk, or lime, under a considerable depth of mould. Marshy grounds generally chill it. Though it may be reckoned a strong plant, yet the ground on which it is sown ought to be in fine tilth, because shooting out a great number of roots quickly, the mould ought to be loose, and the staple deep. It may be sown at any time, but the spring is the best season; as experience has generally evinced.

Where the drill-plough is employed it makes channels, which, at the same time, covers the feed

with the proper depth of earth.

However, it is not necessary to horse-hoe the alleys between the beds of the sainfoin, so often as between those of corn. Once a year will be sufficient for the alternate alleys; so that one half of them may be rested yearly, and the hay made thereon. This renders the expence trisling, and the sainfoin may last thirty years upon the same ground, which will be the better adapted to receive grain by thus frequently stirring.

This grass will grow almost upon any land, even the soils generally reputed to be barren will receive it in some degree, provided its roots be not chilled by a cold clay, or other substances which retain water. It has another advantage also, which is, that it may be mown at different degrees of ripeness, with nearly the same prosit upon the crop.

The fainfoin even that has yielded its feed may be cut down and dried, and will then produce better fodder for large cattle than straw, or the coarse hay of overslown meadows.

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M. du Hamel

M. du Hamel thus describes the best manner of

making fainfoin into hay.

"Within a day or two after it has been mown, (fays he) it will be dry on the upper fide if the weather be good. The fwarths, or mown rows, should then be turned, not fingly, but two and two together; for by thus turning them in pairs, double the space of ground is left between pair and pair, and this needs but once raking; whereas, if the swarths were turned singly, that is, all the same way, the ground would require as much raking again.

"As foon as both fides of the swarths are a little dry, they should be made up into small cocks the same day they are turned, if possible; for when the sainfoin is in cock, a less part of it will be exposed to the injuries of the night, than when it

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lies in the open field.

"These little cocks of sainsoin may be safely made into larger ones, and that without waiting for their being so thoroughly dry as those of common hay ought to be before they are laid together; because common hay, by sinking down closer, excludes the air necessary to keep it sweet, so that if the weather prevents its being frequently stirred and opened, it will heat, turn yellow, and be spoiled; whereas sainsoin, by admitting the air more freely, because its stalks are less flexible, will remain much longer without any danger of fermenting.

"Sainfoin hay is never better than when it has been dried by the wind only, without the affiftance of the fun. A little rain, or a mift, which will turn common hay, clover, and even lucerne, black, will do no harm to fainfoin which is not

really spoiled, till it rots upon the field.

"But should the weather threaten rain, while the sainfoin is not yet dry, it may be laid up in ricks, ricks, and thatched. That which is laid up quite dry, will come out of the rick of a green colour, that which has heated in the rick will look brown.

"It requires, however, some experience to know at what time it is best to cut the seeded sainfoin. because all its feeds do not ripen at the same time. Every ear begins bloffoming at its lower parts, and continues to blow gradually upwards for many days, fo that before the flower is gone off the top, the feeds are almost filled at the bottom. If the cutting, therefore, be deferred till the top feeds are quite ripe, the lower ones, which are the best, will be shed and lost. The best time to cut it is, when the greatest part of the seeds are well filled; i. e. the first blown ripe, and the last beginning to be full. The unripe feeds will ripen after cutting; and will prove, in all respects, as good as those which were ripe before. For want of observing this rule, some have suffered their sainfoin seed to stand till all of it has shed, and been lost in cutting.

Sainfoin should never be cut in the heat of the day, or while the sun shines out; for then much, even of the unripe seed, will shed in the morning. The right time for this work is in the morning or the evening, when the day has rendered

the plants supple."

M. du Hamel observed, that lucerne, like sainfoin, may be cut either before it blossoms, while it is in bloom, or when the seed is ripe. The only things to be taken notice of, as he observes, are:

1. That it makes the best fodder, when cut before its natural shoots come out, and consequently

a good while before it bloffoms.

2. That the earlier it is cut, the fooner it pro-

duces a new crop.

3. That lucerne requires more time to dry into hay than fainfoin; but yet it must not be left too B b 2 long

long upon the field, left it should heat, and damage

the young shoots rising for another crop.

4. That rain hurts lucerne when cut more than it does fainfoin; it should therefore be housed as soon as it is dry; for this hay cannot be pressed so close together in cocks, but that the water will penetrate into it, and rot it.

5. It lucerne grows yellow before it is in the bloom, it is generally a fign that its root is attacked by some infect in the earth. That these may therefore be destroyed before they come to the root, and the grass preserved, it is advised, in this case, to cut it down as the best preservative.

6. The feed, when it is to be fown, must stand till it is quite ripe, and that crop of grass is lost.

The tops of the plants where the pods grow, when the feed is quite ripe, should be cut off with a sharp sickle (taking care to shake them as little as possible) and then should be laid on a cloth, on which they are to be dried in the shades, afterwards beaten out and cleaned. The rest of the grass should afterwards be cut down, in order to clear the field.

M. de Chateauvieux has made several experiments upon this plant; that gentleman talks much of transplanting; but Mr. Young, who has tried all the methods recommended by different persons concludes, That the usual drill husbandry is superior to this transplanting method, and that both these modes are certainly superior to the broad-cast way of sowing it.

Some have distinguished eight different species of this plant; but that which is called the greater upright Medie, with purplish flowers, is the fort which is cultivated for the food of cattle. It has a perennial root, and an annual stalk, which rises to the height of three feet in good land. In June it slowers, and its feeds ripen in September.

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The different kinds of lucerne are, one with violet coloured flowers, another with yellow flowers, and a third with yellow and violet coloured flowers mixed, and a fourth with variegated flowers; but it has been observed, that these are only accidental variations; yet neither the yellow, nor the variegated flowered lucerne, is generally found so strong as that with purple flowers. It is besides remarkable for lasting long upon the land. Columella says, it will continue for ten years. Pliny says, even for thirty; and it has been observed farther, that it will sometimes bear cutting down four or six times in a year; it is recommended also, because it enriches the land on which it grows, and has sometimes been found to be a remedy for sick cattle.

BURNET is a kind of grass which some have spoken greatly in favour of, whilst others, with no less considence, have afferted it to be good for nothing. It is seldom in extremes like these that either party is found to be in the right. This may be afferted with justice in the case before us; and it may also be added, that the culture of this plant has been no less hurt by the immoderate praises bestowed on it by its advocates, than by the contemptuous manner in which its enemies have spoken of it.

Mr. Miller diffinguishes no less than seven different species of burnet; but three only of them at most are to be reckoned amongst the sorts which are proper for the sood of cautle; namely, the first greater burnet saxifrage with a white umbel; a second greater burnet saxifrage; and, thirdly, a lesser burnet saxifrage. All these are native plants, and all are hardy; but the largest forts would be expected to be preferred by the farmer, as yielding the greatest quantity of sodder.—There is another kind of German burnet, which some think B b 3

might do well in England, as ours probably might also in Germany. It would at least be worth while

to put them to the trial.

The first of the three species above-recommended grows naturally in woods, and on the fides of banks near hedges, &c. Of this fort the lower leaves are winged, and composed of three pairs of heart-shaped lobes, terminated by an odd one. They are sharply fowed on the edges, and fit close to the mid-rib. The lower lobes, which are the largest, are near two inches long, and one and a half broad at their base, their colour being of a dark green. The stalks grow more than a foot high, dividing into four or five branches. The lower part of the stalk is garnished with variegated leaves, shaped like those at the bottom, but smaller. -Those upon the branches are short, and the branches are terminated by fmall umbels of white flowers, which are composed of smaller umbels The flowers have four heart-shaped or rays. petals, which turn inwards, and are succeeded by two narrow oblong channelled feeds. In July it flowers, and the feeds open in autumn. A variety of this, with red flowers, is frequently found among the other, as it is from the same seed that they both rife.

That which we call the second fort grows naturally in dry gravelly pasture. Its lower leaves have five or fix pairs of lobes, terminated by an odd one, and are deep cut, almost to their mid-rib, in form of wings. The stalks are slender, rising generally to about a foot in height, and sending out a few branches, which have a trifid leaf placed at each joint, and are terminated by small umbels of white slowers, composed of several rays, stands upon pretty long foot stalks. The slower seeds, &c. are smaller, but in every other respect similar to the

preceeding.

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It is observed, that near half the grass in some places, especially about Windsor, is burnet. We are told, that M. Rocque has sound it capable of growing on the driest land. Many who have seen the burnet which he has raised, have thought, that if this plant were more generally cultivated, there would seldom be a scarcity of hay in England.

It is recommended to be fown on land that is in fine tilth, and free from weeds. Such a fork as the gardeners commonly clean their asparagus with, is a good instrument for extirpating the couch grass, which to this plant is the most hurtful of all. The dragging of an acre will cost about seven shillings. Where the land is poor, it should be laid down and dried.—The seed may be covered with a light harrow, but will not bear to be deeply buried; and the ground, to make it smooth for mowing, should

be properly rolled.

The quantity of ten pounds of burnet feed may generally do for an acre of land; but it is thought that from fourteen even to fixteen may do better, because the hay made from burnet proves too coarse, when the plants, being too thin, grow too large. Where a great quantity of weeds are found, it will be least chargeable to let them grow up with the burnet, till it is about fix inches high, than to use the hoe; then the whole may be mowed, and gathered clean off, after which the growth of the burnet will prevent that of the other weeds; nor can the scythe easily hurt it, because its heart is within the ground.

It is adviseable, when the burnet does not grow every where equally, to let some plants be drawn where they are too thick, in order to be planted where they are thinner. If the land be not got in order for sowing in a proper season, the burnet may be transplanted from a nursery, such as is mentioned by M.Chateauvieux, at Michaelmas, and

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fet at nine or twelve inches distance every way, as

the foil may fuit them.

What feed is fown in May, may be mown in July. That which is fown in June, will yield a good crop; but must be cut only once, and the same of that which is sown in July. The plants which spring from the seeds sown in August, should be moved to destroy the weeds. The mowings may either be given to horses green, or when made into hay; but the first crop is apt to purge them.

It is proper to mow burnet only once the first year, in order to leave it rank for the winter, so that it will be ready to feed in March, and to mow

again in April.

If the feeds of this plant are to be faved, it must

not be fed nor mowed in the fpring.

About the middle of July, the feed will be reaped, like wheat, and threshed before it is too dry, lest it should shed, and afterwards it should

be dried in a proper manner.

"This plant (fays my author) is not apt to lose its leaves in drying, and though the hay made of it be sticky, yet after threshing it, will be more agreeable to horses. Upwards of three loads may be reaped from an acre, and forty bushels of seed.

"It is good not only for horses, but also for other cattle, even for swine." M. Rocque says, it is a good cure for the sting of a wasp; and Mr. Worlidge says, there never needs to want cheese or butter where it grows. "From whence (adds he) it cometh, that the Netherlands abound so much in that commodity, and only, as it is supposed, on account of the plenty of this herb."

general are more ignorant, than of lowe which relate to graffes; for example, he lays, that " Mol of them suppor when an old patture is plowed up.

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C H A P. XIX.

Farther Observations on GRASSES, natural and artificial.

T is of little consequence (as some have observed) for the husbandman to be acquainted with all the different species of grass which may be raised upon any land: the number of these, as far as relates to the farmer's use, is very small. And for this reason, as a justly esteemed author observes, small must be the trouble of collecting these, and the benefit obvious, as will appear to any one at first fight. "Would not any one (adds he) be looked on as wild, who should fow wheat, barley, oats, rye, peafe, beans, vetches, buck-wheat, turnips, and weeds of all forts together? Yet why is it much less absurd to do what is equivalent in relation to graffes? Does it not import the farmer to have grass in plenty, and will cattle thrive equally upon all forts of food? We know the contrary. Horses will scarcely eat hay that will do well enough for oxen and cows. Sheep are particularly fond of one fort of grass, and fatten upon it faster than on any other in some northern countries, if we believe Linnæus. may they not do the same in England? How shall we know till we have tried? Nor can we fay what is valuable in Sweden may be inferior to other graffes in England; fince it appears by the Flora Suecica, that they have all the good ones which we have um of himo

It has been remarked by Mr. Miller, that there is no part of husbandry of which the farmers in general are more ignorant, than of some which relate to graffes; for example, he says, that "Most of them suppose when an old pasture is plowed up, that it can never be brought to have a good sward again;

again; so their common method of managing their land after plowing, and getting two or three crops of corn, is to fow with their crops of barley fome grafs-feeds, (as they call them) that is, either the red clover, which they intend to stand two years after the corn is off the ground, or rye-grass mixed with trefoil; but as all these are at most but biennial plants, whose roots decay soon after their seeds are perfected; fo the ground having no crop upon it, is again plowed for corn; this is the constant round which the lands are employed in by the better fort of farmers; for I have never met with one of them that had the least notion of laying down the land to grass for any continuance; therefore the feeds which they usually fow are the best adapted to answer this particular purpose.

To these observations may be added, that when the weather is fine, sainfoin will dry well enough in the swarths without their being turned; but when wet weather occasions a necessity for turning them, this must be done very gently while they are moist, and not two swarths together as in the other hay, that is, hay that is made of sainfoin before it has seeded. Where the swarths are turned up with the rake-handle, it is recommended to raise the ear-side first, and to let the stub-side rest on the ground in turning; but where it is performed with the teeth of the rake; let the ears be rested on the ground, and the stub-side be turned

up.

Sainfoin is fometimes threshed on the field without being cocked, but where it is cocked at all it should be done soon, lest the swarths being dry, a great deal of the seed should be lost in separating them, on account of the ears being entangled.

The threshing is sometimes performed in the field, and sometimes in the barn. In the first instance, it cannot be done but in good weather and in the mid-day fun. A large sheet, in this case, must be pegged to the ground for two men to thresh upon with their shails, while two others are employed to bring them in a smaller sheet a fresh supply, and two more to clear away what has been threshed. The seed is to be emptied out of the large sheet, and riddled through a large sieve, after which it is to be put into sacks and carried to the barn for winnowing. If the hay gets wet,

it will generally be spoiled entirely.

" A very important, and at the same time a very difficult article (fays my author) is that of keeping the feed that has been threshed in the field without ever having been wetted. If it be winnowed immediately, and only a little of it laid amongst a great heap, it will ferment to fuch a degree in a tew days, that the greatest part of it will lose its vegetative quality: during that fermentation, it will become hot, and fmell four. Spreading it upon a barn-floor, though but feven or eight inches thick, will answer no end, unless it be frequently and regularly turned, both day and night, until the heating is over; nor will even this make it keep its colour fo bright as that which is well housed, well dried, and threshed in the winter. This last laid up unthreshed, will keep without any danger of spoiling, because it does not lie close enough to heat. The best way to preserve the seed threshed in the field, is to lay a layer of straw on a barn-floor, and upon that a thin layer of feed, and so on alternately, by which means the feed, mixing with the straw, will be kept cool, and come out in the fpring with as green a colour as when it was put in."

The greatest part of the sainfoin that is sown, is spoiled by being indiscreetly fed by cattle. Mr. Tull is against feeding it at all during the first and second year, or at any time in the spring. He

fays, he has recovered worn-out pieces of fainfoin by plowing them in alleys three feet wide, and leaving beds of fainfoin of the fame breadth alternately between them. The plants, by extending their roots in these new plowed alleys, have recovered their vigour and yielded good crops of hay; and he adds, that fainfoin is found to enrich whatever ground it is planted on.

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That fort of artificial grass, called Lucerne, has been traced as far back as to the time of Darius, surnamed Hystaspes, and had long since been cultivated in Italy and Spain, in France and Switzerland, but in England the cultivation of it has made but little progress; though its hardiness may well recommend it, as being as likely to thrive here as in the warmer climates; for a proof of which Mr. Miller has observed, that the seeds of it which happened to be scattered up and down in autumn, have come up, and after enduring the severe cold of winter, have been very fine and strong.

"The feeds of this plant (adds he) were brought over from France; but whether for want of skill in its culture whereby it did not succeed, or that the people were fo fond of going on in the old, beaten road, as not to try whether it would succeed here or not, was the occasion of its being entirely neglected in England, I cannot fay; but it is certain, that it was neglected for many years to as to be almost forgotten. However, I hope to give fuch directions for its culture, as will encourage the people of England to make farther trial of this valuable plant, which grows in the greatest heat, and will thrive also in very cold countries, with this difference only, that in very hot climates, fuch as the Spanish West-Indies, &c. where it is the chief fodder for their cattle at this time, they

cut it every week; whereas, in cold countries, it is feldom cut oftener than three or four times in a year. And it is very likely that this plant will be of great service to the inhabitants of Barbadoes, Jamuica, and the other hot islands in the West-Indies, where one of the greatest things they want is fodder for their cattle; fince, by the account given of this plant by F. Feuille, it thrives extremely in American countries, especially about Lima, where they cut it every week, and bring it into the market to fell, and it is there the only fodder cultivated. 1 20 1 at 1 1 1 boggental Capital I

"It is also very common in Languedoc, Provence, and Dauphiné, and all over the banks of the Rhone, where it produces abundantly, and may be mown five or fix times a year. Horses, mules, oxen, and other domestic cattle, love it exceedingly; but above all when it is green, if they are permitted to feed upon it; and especially the black cattle, which will feed very kindly upon the dried plant, the excels of which is by many people thought to be very dangerous; but it is faid to be exceedingly good for milch cattle, to promote their quantity of milk, as also to agree with horses the best of all; though sheep, goats, and most other cattle will feed upon it, especially when young! It is the work at the west theory trans

"The directions given by all those who have written of the culture of this plant are very imperfect; for most of them order the mixing of this feed with oats or barley as is done for clover; but in this way it seldom comes up well, and if it does it will draw up so weak, by growing amongst the corn, as not to be recovered under a whole year, if ever it can be brought to its usual strength again. I ton visualineasi vino escendido de

"Others have directed it to be fown upon a low, rich, moist foil, which is found to be the worst next to a clay, of any, for this plant, in both which the roots will rot in winter, and in a year or

two the whole crop will be deftroyed.

"The foil in which this plant is found to fucceed best in this country, is a light, dry, loose, fandy land, which should be well plowed and dressed, and the roots of all noxious weeds, such as couch-grass, &c. destroyed, otherwise they will overgrow the plants while young, and prevent

their progress.

"The best time to sow the seed is about the middle of April, when the weather is settled and fair; for if you sow it when the ground is very wet, or in a rainy season, the seeds will burst and come to nothing, as is often the case with several of the liguminous plants, therefore you should always observe to sow it in a dry season; and if there happens some rain in a week or ten days after it is sown, the plants will soon appear above the ground.

"The quantity of natural grass which grows with it, (when sown in broad-cast) and choaks it, has chiefly occasioned its ill success; and we are informed that some gentlemen who, to remedy this inconvenience, have drawn a drag-harrow across the ground, found it advantageous. Mr. Rocque, as some think, has improved on this. And Mr. Miller recommends the following method of culti-

vating this kind of artificial grass.

"After having well plowed and harrowed the land very fine, you should make a drill quite across the ground almost half an inch deep, into which the seeds should be scattered very thin; then cover them over a quarter of an inch thick, or somewhat more, with the earth; then proceed to make another drill about a foot and an half from the former, sowing the seeds therein in the same manner as before, and so go on through the whole spot of ground, allowing the same distance between row and

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row, and feattering the feeds very thin in the drills. In this manner, an acre of land will require about fix pounds of feed; for when it is fown thicker, if the feeds grow well, the plants will be fo close as to spoil each other in a year or two, the heads of them growing to a confiderable fize, as will also the roots, provided they have room. I have meafured the crown of one root which was in my poffession, eighteen inches diameter, from which I cut near four hundred shoots at one time, which is an extraordinary increase, and this upon a poor, dry, gravelly foil, which had not been dunged for many years; but the root was at least ten years old; so that if this crop be well cultivated it will continue for many years, and be equally good as when it was first fown; for the roots generally run very deep in the ground, provided the foil be dry; and although they should meet a hard gravel a foot below the surface, yet their roots would penetrate it. and make their way downward, as I have experienced, having taken up some of them which were above a yard in length, and had run two feet into a rock of gravel, fo hard as not to be loofened without mattocks and crows of iron, and then with much difficulty.

"The reason for directing this seed to be sown in rows, is, that the plants may have room to grow, and for the better stirring the ground between them, to destroy the weeds, and encourage the growth of the plants, which may very easily be effected with a Dutch hoe, just after the cutting of the crop each time, which will cause the plants to shoot again in a very little time, and be much stronger than in those places where the ground cannot be stirred; but when the plants first come up, the ground between should be hoed with a common hoe; and if in doing this, you cut up the plants where they are too thick, it will cause

those that remain to be much stronger.—This hoeing should be repeated two or three times while the plants are young, according as the weeds are produced; observing always to do it in dry weather, that they may the better be destroyed, for if it be done in moist weather they will root, and grow

again.

"With this management, the plants will grow to the height of two feet or more by the beginning of August, when the flower will begin to appear; at which time the Lucerne should be cut, observing to do it in a dry feafon, if it is to be made hay of, and keep it often turned that it may foon dry, and be carried off the ground; for if it should lie long upon the roots, it will prevent their shooting again. After the crop is taken off, you should ftir the ground between the rows with a hoe to kill the weeds, and loofen the furface, which will cause the plants to shoot out again in a short time; so that by the beginning of September there will be shoots four or five inches high, when you may turn in sheep upon it, to feed it down; nor should the shoots be suffered to remain upon the plants, which would decay when the frosty weather comes on, and fall down upon the crown of the roots. and prevent their shooting early in the succeeding ipring.

"The best way, therefore, is to feed it until November, when it will have done shooting for that season; but it should not be fed upon by large cattle the first year, because the roots being young, would be in danger of being destroyed either by trampling upon them, or their pulling them out of the ground; but sheep will be of service to the roots by dunging the ground, provided they do not eat them too close, so as to endanger

the crown of the roots.

"In the beginning of February, the ground should be again stirred with the hoe, to encourage them to shoot again; but in doing this, care should be taken not to injure the crown of the roots upon which the buds are at this time very turgid, and ready to push. With this management, if the foil be warm, by the middle of March, the shoots will be five or fix inches high; when, if you are in want of fodder, you may feed it down till a week in April, after which it should be suffered to grow for a crop, which will be fit to cut by the beginning of June, when you must observe to get it off the ground as foon as possible, and ftir the ground again with the Dutch hoe, which will forward the plants shooting again, so that by the middle, or latter end of July, there will be another crop fit to cut, which must be managed as before; after which, it should be fed down again in autumn; and as the roots, by this time, will have taken deep hold in the ground, there will be little danger of hurting them if you turn in large cattle; but you must always observe not to suffer them to remain after the roots have done shooting.

"In this manner you may continue constantly to have two crops to cut, and two feedings upon this plant; and in good seasons there may be three crops cut, and two feedings, which will be a great improvement, especially as this plant will grow upon dry, barren soils, where grass, in general, will come to little, and will be of great use in dry summers, when the grass is often burnt up; and as it is an early plant in the spring, so it will be of great service when sodder falls short at that season, when it will be fit to feed at least a month before grass or clover; for I have had this plant eight inches high by the tenth of March, old style,

at which time the grass in the same place has

scarcely been one inch high.

"That cold will not injure this plant I am fully fatisfied; for in the very cold winter in 1728-9, I had some roots of it which were dug up in October, and laid upon the ground in the open air till the beginning of March, when I planted them again, and they shot out very vigorously foon after; nay, even while they lay upon the ground, they struck out fibres from the under side of the roots, and had begun to shoot green from the crown of the roots. But that wet will destroy the roots I am fully convinced; for I fowed a little of the feed upon a moist spot of ground, for a trial, which came up very well, and flourished exceedingly, during the fummer feafon; but in winter, when the great rains fell, the roots began to rot at the bottom, and before spring most of

them were destroyed.

"The best places to procure seed from are Switzerland and the northern parts of France, which fort of feed fucceeds better with us than that which comes from a more fouthern climate; but this feed may be fowed in England in great plenty; in order for which, a finall quantity of the plants should be fuffered to grow uncut till the feeds are ripe, when it must be cut and laid in an open barn, where the air may freely pass through; but the seed must be defended from the wet, for if it be exposed thereto, it will shoot whilst it remains in the pod, whereby it will be spoiled. When it is quite dry, it must be threshed out, and cleansed from the husk, and preserved in a dry place till the season for sowing it: and this feed fowed in England is much preferable to any brought from abroad, as I have feveral times experienced the plants produced from it, having been much stronger than those produced from the French Helvetian, and Turkey feeds,

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which were fown at the same time, on the same

foil, and in the same situation.

" I am inclinable to think, that the reason of this plant's not fucceeding when it has been fown in England, has either been occasioned by the fowing it with corn, with which it will by no means thrive (for though the plant be very hardy when grown pretty large, yet at its first coming up, if it be incommoded by any other plant or weeds, it feldom does well; therefore it should always be fown by itself, and carefully cleared from weeds until it has strength, after which it is not easily destroyed) or perhaps people have sown it in a wrong feafon, or in wet weather, whereby the feeds have rotted, and never come up, which has difcouraged the farmer from attempting it again; but however the fuccess has been, I dare aver, that if the method of fowing or managing this plant, which is here laid down, be duly tollowed, it will be found to thrive as well as any other fort of fodder now cultivated in England, and will continue much longer; for if the ground be duly ftirred after the cutting of each crop, and the first crop fed as has been directed, the plants will continue in vigour twenty years or more, without renewing, provided they are not permitted to feed, which would weaken the roots more than four times the cutting would do.

"The hay of this plant should be laid up in close barns, it being too tender to be kept in ricks open to the air as other hay; but it will remain good, if well dried before it be carried in, for three years. The people abroad reckon an acre of this fodder sufficient to keep three horses all the year round; and I have been assured by persons of undoubted credit, who have cultivated the plant in England, that three acres of it have fed ten cart-horses from the end of April to the beginning of October,

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without any other food, though they have been constantly worked.—Indeed, the very best use that can be made of this grass, is, to cut it, and give it green to the cattle. Where this has been daily practifed, I have observed that by the time the field has been cut over, that part which was first cut has been ready to cut again; fo that there has been a constant supply in the same field from the middle of April to the end of October. When the feason has continued mild, and when the summers have been showery, I have known fix crops cut in one feafon; but in the dry feafons there will be always three. When the plant begins to flower, it should be cut; for if it stands longer, the stalks will grow hard, and the under leaves will decay, and then the cattle will not so readily eat it. Where there is a quantity of this cultivated, some of it should be cut before the flowers appear, otherwife there will be much to cut within a proper time.

"When this is made into hay, it will require a great deal of making; for, as the stalks are very fucculent, it must be often turned, and exposed a fortnight before it is fit to house; for this requires a larger time to make than fainfoin; therefore, when it is cut it should be carried to make upon fome grass-ground, because the earth in the intervals of the rows will wash up, and mix with the hay in every shower of rain; and by carrying it off as foon as it is cut, the plants will shoot out again foon; but it is not fo profitable for hay to cut green for all forts of cattle, but especially for horses, which are extremely fond of it, and to them it will answer the purpose both of hay and corn, and they may be worked at the same time just as much as when they are fed with corn, or dry food.

AS to common grafs, Mr. Miller observes, "That he doubts not but that he shall be able to prove it possible to lay down land which has been in tillage with grass in such a manner, as that the sward shall be as good, if not better, than any natural grass, and of as long duration. But this is never to be expected in the common method of fowing a crop of corn with the grass feed; for wherever this has been practifed, if the corn has fucceeded well, the grass has been poor and weak, fo that if the feed has not been very good, the grals has scarcely been worth standing; for the following year it has produced but little hay, and the year after the crop is worth little, either to mow or feed; nor can it be expected to be otherwise, as the ground cannot nourish two crops."

On this principle, the following directions are given for the management of lands intended for pasture:

In the first place, when ground is to be laid down for grafs, it is advised as above, that no other crop should be sown with it, and that the land should also be cleared from weeds of all forts. On dry land, the best time for sowing, is about the middle of the month of September, or, in case of the appearance of rain, rather fooner, on account that the land being warm, some showers of rain falling afterwards, may prove serviceable in making the grass take root, especially if the ground be properly rolled before the frosts of winter. rolling is also to be repeated again in March, which will contribute to join the sward at the bottom, and to produce a good fummer crop of hay. In cold lands, whereon earlier lowing can take place, it will be fo much the better. On the other, where the ground cannot be prepared in autumn, the middle or latter end of March, according to the feason. But the danger of sowing late, is that of dry weather, especially where the foil is light and C c 3 dry.

dry. It will then be more particularly proper to roll the ground well, to fettle the furface, in order to prevent its being blown away, together with the feeds, by the March wind. The farmer's own judgment will best direct him to the proper kinds of feeds; and as to the quantity, that will mostly depend on its being light and chaffy, or its being naked, as much more of the former is necessary than of the latter. Where clover feeds are to be interspersed, the latter should be sown alone after those of the other grass.

The ground is to be harrowed lightly after the fowing, in order to bury the feeds; but this is recommended to be done with a fhort toothed harrow, lest the depth would prove too great. Where there is a dry surface, it should be rolled two or three days after sowing, with a barley roller, to

break the clods, and fettle the ground.

After the feeds are come up, a thorough weeding should be given; and when this is properly performed, the rolling at proper intervals will occasion it to form a thicker bottom, so as to cover the whole surface of the ground with a thick sward.—When this end has been attained, the best method of keeping it so, is to roll it every spring and autumn with a heavy roller, and keep it clear of weeds; as also to change the seasons of mowing, and not to mow the same ground every year; but to mow one season, and feed the next, lest the ground should be damaged by being too much exhausted.

the fall of April may be propers but the and of April may be propers but the ands. It is generally belt not to fow it, till are the find has exhaled the moulture, or about the looked of May. In weather that is either extremely dry, the bufbandman thousand.

C H A P. XIX.

Of HEMP, FLAX, and MADDER.

HEMP is generally fown upon a fine rich loam, brought into good tilth. Newly broken up lands have already been mentioned as proper for it; but the best soil of all is generally reckoned to be a flat furface, near a dyke or stream, which the sediment of the waters enriches when they overflow. The first plowing should be given early in the au-Some even give this stirring by hand. Which ever method be adopted, the ground should be loofened very deep, and laid rough, to be mellowed by the succeeding frosts. When it is sown on lands newly broken up, the furface should be pared off and burnt, or otherwife prepared, as has been already directed in the article of uncultivated lands. The ground should be plowed again in February, and then horse dung, the scouring of ponds and ditches, and some strong manure, should be laid on for the fummer.

In order to prepare the hemp ground thoroughly for the reception of the feed, two or three plowings should be given in the springs, about a fortnight or three weeks intervening between each of them, and if any lumps or clods still remain, these are to be broken by hand, as it is necessary that the land

should be quite level.

As to the season for sowing, that depends mostly on the nature of the soil. On dry light grounds, the latter end of April may be proper; but in wet grounds, it is generally best not to sow it till after the sun has exhaled the moisture, or about the later end of May. In weather that is either extremely moist, or extremely dry, the husbandman should C c 4

forbear fowing, though just after a gentle shower

is no improper time for the operation.

It is always to be observed, that the seed should be the growth of the preceding year, lest being of an oily nature, it might prove too rancid if longer kept, and also lose somewhat of its vegetative power. Changing the seed every second or third

year is likewife adviseable.

Care must be taken to cover the seeds well with earth after lowing, as well as to water the ground constantly, till they have risen, otherwise the birds, pigeons especially, will commit great devastation among them. Weeding of hemp is a nice operation, because, in the course of it, if the plants are twifted, broken, or bent, there is no hope of their - rifing again; nevertheless, where there is a danger of the weeds overpowering the hemp, some careful persons must be employed to root them out; and if this is properly done, the growth of the plants will be forwarded by the loofening the furface of the earth in disengaging them. In extremely dry seafons, it will be proper to overflow the hemp grounds, or even to water them by hand, if polfible. when there is a danger of the hemp's being n order to propare the h

That which is called the male hemp, generally ripens fooner than the female; but the time of either ripening depends in a great measure upon the nature of the soil. The male hemp shews its ripeness by turning yellow at the top; but should be cut while it is yet greenish. The female, or seed-bearing hemp, is known to be ripe, not only by the same signs as the male, but also by the seed turning brown, and the opening of their capsules. As soon as the male sort is ripe, it should be pulled, stem by stem, taking care not to injure the female, which may be suffered to remain in the ground per-

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harps three weeks longer, and must then be pulled in the same manner as the other.

The handfuls pulled should be nearly of the same length, and their roots placed as even as possible.—
It is customary with some to tie up each handful, especially of the male hemp, with a stalk of hemp, then lay it in the sun to dry the leaves and slowers, which are afterwards beaten off, by striking it against a wall or a tree. Several of these handfuls being afterwards combined in a bundle, are thus

carried to the watering place.

When hemp is fully grown, its general height is from five to fix feet height; in some countries we have heard of their stems growing to double that height. If female hemp is suffered to stand till it is perfectly ripe, it is apt to have a woody bark, and can feldom afterwards be rendered to a proper degree of fineness; but if the best seed only is fown, the loss of a small part is what may well be permitted, for the fake of the superior advantage of having perfect feed, by letting a proper number of the plants attain their full maturity. The hemp employed in cordage, is in this case a matter worthy of peculiar attention, as the fafety of ships so often depends upon the strength of their fails and cables, by which alone much wealth, and many useful lives are often preserved to the state.

A method used by some for separating the finest grains of wheat for sowing, by throwing the corn to a distance on the barn sloor, may be also practised for obtaining the best hemp seed. The ripple may here be used to separate the whole of the seed from the plant, and this will prevent every incon-

venience which may arise from threshing.

Hemp is steeped in bundles at the bottom of the water, covered with a little straw, and then loaded with pieces of wood, or large stones, in order to keep it five or fix inches below the surface; the intention

tention of which is, to make the bark part from the plant the more readily; but it is dangerous to let it lie too long in the water; if steeped a short time only, its fibres are generally thought to be the better. The usual time allotted to the male hemp, is five or fix days; but the female fort may be two or three days longer; and both should be washed when they are taken out of the steeping place. The bundles must be untied and spread, either upon fand, or rocky ground, or else upon stubble in a new-reaped field; but grass is by no means fit for it, as the place where it is to be laid should be free from every kind of moisture. When dried thus, it should be laid in a place where no damp can come to it, till it is ready for peeling; an operation fo simple, that it is mostly performed by women and children, and is so well known, that it needs not any particular description.

In case of a geat quantity of hemp being to be dried, though many methods or prescribed, that of an oven seems to be the best and safest; but the greatest care should be taken not to scorch it, as an accident of this kind often occasions damages which

are irreparable.

As to that operation called the breaking of hemp, this indeed is, properly speaking, only breaking the reed, or woody part of the ftem within the bark, the filamentous substance only bending beneath the hand. There are three ways of performing this operation; the first is that of beating the hemp with beetles, which is both laborious and tedious; or that of the Dutch hand-break, which is generally reckoned to be preferable; or otherwise by flatted rollers, worked by horses, wind or water. This last is most expeditious; but dangerous on account of the accidents which sometimes happen, by the rollers catching hold of the workmens fingers; the only means of preventing which is the having inears : an

an iron crow ready, in such case, to insert immedi-

ately between the rollers.

After breaking, the hemp is to undergo a fecond operation, which is called fwingling or fcutching, which is done in one or other of the following ways:—The workman, in the first place, takes a handful of hemp in his left hand, and holds it over the edge of a board, strikes it with the sharpened edge of a long, flat, and strait piece of wood, commonly called a fwingle-hand, or feutcher. An author of an Irish publication advises, that the cuting edge of the scutcher should be made of a circular form, that its greatest force may fall upon the middle of the hemp, to spread it; by which means it is likely to be the more equally cleared of the remaining pieces of the reed; but this proves very laborious and tedious. A method of erecting water mills has therefore been adopted, in which feveral scutches, fixed on the same rule, have moved with greater velocity. A greater waste is generally made of the hemp by this last mode, but the work goes on with more expedition

The heap thus prepared, before it is heckled, must yet undergo what is called the beetling, in order to separate and loosen it. The beetles generally used for this purpose, are moved either by

hand or by water.

It is proper that the store-rooms appointed for keeping this commodity should be well aired, and raised above the ground, both in order to keep it dry, and to prevent the approaches of rats and mice, which might otherwise destroy it. In the piling of it, care should be taken to put together as nearly as possible such as is of equal length, and alike in quality; it should be quite dry before it is put into roles, and spaces less between them for the admission of fresh air. Care should be taken, from time to time, to examine whether the homp heats;

heats; for if it does, the piles or heaps must be immediately taken down, and the bundles vented and exposed to the air, and afterwards removed into places proper for them.

FLAX is generally cultivated on a stiff loam, in fine tilth, and on a spot near the water's side, &c.

as has been observed with regard to hemp.

It is common in the fouthern counties to fow part of the feed in September and October. Lint-feed is fown again in the spring; but this last sowing is not expected to yield so plentiful a crop; yet the flax which it produces is generally finer. The spring flax is that which will here be most particu-

larly noticed.

Where the land intended for flax is stiff, it should not be tilled till it is wet. If the ground has been long in tillage, it should be plowed deep before winter, and laid up in very high ridges, in order to its being mouldered and loofened by the frosts of that feason. In case the land be not too wet, in February some very rotten dung should be laid in the furrows. In March or April, for the northern counties, another plowing is to be given, to -lay the land smooth; the clods are to be broken by hand, and the feed fown and harrowed in with a light bush harrow, being buried not above an inch deep in the foil; and if it be moist and cold, a little pigeons dung may be mixed in the feed. Wet lands may likewise be laid out in beds of thirty or forty feet wide, with trenches between them, in order to drain off the water.

The large, oily, heavy, bright brown lint-feed, is generally the best; and more or less of this may be sown, as the husbandman intends, either to raise a quantity of lint-feed for sowing, or to have very fine and soft flax. In the former case, a much less quantity should be used, and a strong soil chosen,

with

with a view to the vigour of the future plants; and fowing it in drills will therefore be generally most adviseable.

Flax is fometimes fown with perennial grass feeds, as these do not impede its growth, but after it is pulled up, generally increase prodigiously.

A flight strewing of soot, ashes, &c. is said to destroy those insects, which are apt to damage flax. At any rate, this kind of dressing will be likely to increase its vigour. The plants should be weeded, and this is best done by persons who are bare-footed; they may indeed sit down upon them; but if the flax is trodden upon, it will prove highly injurious.

As fine flax is often liable to be laid by storms, the best method of preventing this evil, is that of running small ropes across the fields, both lengthwise and breadth wise. These being fastened where they intersect each other, and supported by stakes sixed at proper distances from a fort of netting, which proves its best security. The best time to pile flax, is before it is over ripe; that is to say, when its stalks begin to turn yellow, when the seeds begin to be brown, and when the leaves begin to fall.

Having attained its proper maturity, the flax is pulled in handfuls; but as it is seldom all equal in strength and ripeness, it would be best to pull the strongest and ripest plants first, by which means these would be separated from the weaker and greener, which is of great importance in the watering. The earth and weeds adhering to the roots, must be taken carefully away, and then the flax must be laid regularly upon the ground in handfuls, with the seed-ends turned towards the south. These handfuls should neither lie quite parallel to, nor directly crossing each other, but a little slanting upwards, in order to admit the free circulation of the air through the bundles.

Where

Where flax is raised only for the sake of the seed, or where a bad season renders the seed the most valuable part of it, it should, on all accounts, be suffered to stand till it is perfectly ripe, in order to

answer the end proposed.

To ripple the flax, a large cloth is to be placed on the ground, with the ripple in the middle of it. The manner of performing the work is well known; the end is to obtain the lintseed. The seeds are afterwards to be spread in the sun to dry; those which, of their own accord, separate from the pods, are to be considered as the most forward; for which reason they should be kept for sowing. In order to get the remainder, the pods are often broken, either by treading or threshing, to get the remainder of the seeds; all which must, as well as the former, be sisted, winnowed, and cleaned with care; and it must be frequently stirred, or ventilated, after it is laid up, to prevent its heating.

When the flax has been rippled, it should be carried directly to the watering-place, and if the different forts of it have not been previously separated, this must be done now, lest some of it should be rotted before the rest is sufficiently steeped in the water. Running water is not proper for this purpose; first, because it is apt to carry the flax away; and secondly, on account of its not procuring a certain degree of putrefaction, which in

this case is necessary.

After the steeping, the bundles should be spread out like a fan at the root end, and laid on short grass in a dry, new mown meadow, to bleach and supple it. Then it is to be turned from time to time, and to be carried off as soon as it is dry.

Two ways of completing the drying of flax are generally practifed; the one is, that of placing against a wall, upon uprights and cross pieces, a

hurdle.

hurdle, of which the bars are small, and about two inches afunder, and upon this the flax is spread from four to fix inches thick. A small fire made of the broken reeds of flax being kindled with great care under it, it is to be turned equally from time to time; the flax-dreffer taking off only that part of it which is at the fide of the hurdle next the wall, then pushing the rest into its place, filling the vacancy up with fresh flax till the whole operation is finished. Some, indeed, chuse to dry their flax in an oven; but where people are fo impatient as not to let it cool fufficiently, it is apt to injure the flax, as well as endanger the health of those who go in to place the bundles in it in their proper order. Great caution ought therefore to be used in this case. Both evils may be prevented by making the oven no hotter than a person may bear without inconvenience; and for this reason, it is directed to be heated from thirty to fifty-five degrees of Reaumur's thermometer.

MADDER is an ingredient necessary in dying, and such as is now become a considerable article of commerce. There are several forts of it, but that which is most generally cultivated here is that fort called, Rubia Tinstorum Sativa, J. B. III. 2. 714. and C. B. Pin. 333. commonly known by the name of madder, and is of the same species with that plowed in the plantations, in the neighbourhood of Liste and in Zealand.

It will live in any foil, but the produce in all will not be equally good and plentiful. It generally thrives best upon a strong, rich land, with a moist bottom, but dies if it is slooded. The same plowings should be given where the land is in good tilth, as if it were intended for corn, only observing, that the plough cannot go too deep in this tillage.

It

It is customary to take up the plants of madder cautiously, so as not to injure the roots, and especially not to break those slender ones which run just below the surface of the ground. The roots are to be divided into as many portions as there are buds or eyes upon them, and these slips to be carefully replanted, spreading out what runners adhere to them. About two thousand of these sets are reckoned fufficient for an acre of land. When the roots of madder are taken up for dyers, numbers bf plants may be obtained without any dimunition of the profit which they yield in other respects. When the madder grounds are large, a great quantity of plants may be got from them without any confiderable damage to the crop cultivated for fale upon the same principle.

It being practicable to transplant madder at any feason of the year, it will be best to take advantage of such cloudy weather as foretels rain. Autumn, indeed, is generally the best time for the work. When the soil is moist, or liable to be overflowed, the alleys must be made lower than the beds to keep them dry; and at what season soever the madder is planted, it is necessary to keep it clear of weeds, and to stir the earth frequently when the weather is

fine.

It is in these alleys that the stems of the old plants are laid down, (when a supply of new ones is wanted) in order to their being converted into rooted layers. But care should be taken not to lay down too many of the stems, as the perfection of the root depends, in a great measure, upon the flourishing state of that part of the plant which is above ground.

Cows fed with the tops of madder, are said to yield abundance of milk; but it is a little reddish, and the butter is yellow, though generally of an

agreeable taste.

The ground should be gently stirred after the madder has been cut for hay, especially in the alleys, and particularly if the next year it is intended to plant them again. When the same ground is to be planted anew, the whole of it should be thoroughly plowed after all the roots are taken up, and the beds should be made where the alleys were before. Wheat will properly and advantageously succeed to this second crop of madder.

It being necessary to dry madder roots when they are to be used, at a distance from the place of their growth, it is advised, that they should be spread abroad upon a dry lawn. If it is likely to prove bad weather, it will be proper to spread them upon hurdles covered with coarse cloth; or if it be absolutely rainy, they ought to be spread out under sheds, or spread on a barn floor. When the weather alone will not dry the root, ovens may serve for that purpose where the quantity is not great. These are directed to be from forty sive to sifty degrees of Reaumur's thermometer. They might indeed be dried on malt or hop kilns, but that the smoke would damage them.

The madder, after it is dried, may be fold to the dyers, and some even chuse to have it in the root rather than the powder; the sormer having been proved by some experiments to answer the purpose. But as these easily imbibe the moisture of the air, they should be laid, after they are dried, as closely and regularly as possible in barrels, which are afterwards to be headed; and thus they

may be fent to the place of fale.

C H A P. XXI.

Comparison between the Old and New Husbandry.— Of plowing with Horses, and with Oxen.—Of the Implements of Husbandry and Carriage, Appendages necessary to a Farm, &c.

A FTER all that has been faid of both modes of husbandry, it has only appeared in general, that fome plants have been better reared in the old, and others in the new method; but the ingenious au. thor, whom I have fo often had occasion to quote, has observed, " That the comparison of the old and new husbandry in the separate culture of various plants, decides not the general merit of either." For this reason, he thought it necessary to lay out different pieces of land, continuing them respectively for feveral years under the different modes of culture. With the refult of one of his most remarkable experiments on this principle, we shall here prefent the reader, according to the proportions per acre of three roods of a field, the foil perfectly the fame, a good gravelly loam, fit enough for turnips, and at the same time strong enough for wheat. The preceding culture was the fame, yielding barley in 1768, the stubble plowed up in November.—No. 1. was applied to wheat alone, in the horse-hoeing husbandry, on Mr. Tull's principle.-No. 2. applied likewise to that culture, but the crops varied.—The third cropped according to the common Suffolk method of broadcast. The strictest justice being done to each, according to their respective natures.

On the general view of this experiment, the produce of the different parcels of land reduced to their proportions, per acre, were as follow:

"No. I. Drill Husbandry. Wheat every year.

			.03		.1	
Average	Totals	1767 Wheat	1766 Wheat	1765 Wheat }	1764 Fallow	Crops
3 6 4 3 **	13 5 7	3 17 10	3 14 7	5 13 2	1. s. d.	Expences
2 214	7 0	1,1	1 5	2	qrs. bush.	Product
4 9 6+						
O O W ***	Profit o 2 11	Loss 1 3 10	Profit o 3 5	Profit i 3 4	1. s. d.	Profit and Loss

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^{**} Averages of four years. †† Ditto of three years. Average Product of four years, 31. 7s. 12d.

Average	Totals	Average 1764 Turnips 1765 Barley 1766 Clover 1767 Wheat	Crops 1764 Turnips 1765 Wheat 1766 Pease 1767 Wheat Totals
2 8 2	9 12 8	3 4 11½ 2 17 0 2 5 11 1 17 11 2 11 10	" No. II. Expences 1. s. d. 2 19 5 3 5 0 3 1 7 3 6 12 19 6
		No. III. Broad caft Hufbandry. 28 Tons I III 4 4 qrs. I bufh. 4 19 0 3 tons 19 cwt. 6 12 0 2 qrs. 4 bufh. 5 14 0	Drill Husbandry, different Crops. Product Prod. Cash 1. s. d. 15 Tons o 15 o 2 qrs. 2 bush. 4 14 o 1 qr. 3 bush. 2 6 9 1 qr. 2½ bush. 3 3 o 10 18 9
	Profit	Lofs Profit Profit Profit	Profit Lofs Lofs Lofs Lofs
			Profit and Lofs 1. s. d. Lofs 2 4 5 Profit 1 9 6 Lofs 0 14 10 Lofs 0 10 6 Lofs 2 0 3

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COMPARISON.

EXPENCES.

EXPENCES.			
Average, per ann. Drill husbandry,	1	. 5.	d.
wheat every year	3		
Ditto, Drill husbandry, different crops	3		
Superiority of the latter	0	1	5 4
Wheat every year	3	6	43/4
Broad-cast husbandry	2		2
Superiority of the latter	0	18	2 3/4
PRODUCE.			
Broad-cast average, per ann. of 4 years Drill husbandry, wheat every year,	4	14	1
average 4 years	3	7	11/2
Superiority of the former	1	6	111
Broad-cast average of 4 years Drill husbandry, change of crops, ditto	4 2	14	1 8 <u>1</u>
Superiority of the former	1	19	4 3 4
Drill husbandry, wheat every year -	3	7	1 1/2
Ditto, different crops	2	14	81
Superiority of the former -	0	12	54
PROFIT and LOSS.			
Broad-cast, average profit per ann	2	5	81
Drill husbandry, wheat every year, ditto	0	0	8 3 4
Superiority of the former	2	5	01
Dd 3	*	Bro	ad-

			1.	s.	d.
Broad-cast, profit -	-				81
Drill husbandry, different	crops,	loss	0	10	$0\frac{3}{4}$
Superiority of the former			2	15	91

"This experiment (fays my author) is absolutely decisive. Comparisons may be drawn up between the old and new husbandry, from the various culture of different fields; but unless a perfect similarity respecting soil, time, &c. be observed, no conclusions can be drawn from them.—It clearly appears that, under the circumstances of this comparison, the common husbandry is superior to the drill culture; also that the mode of drilling wheat every year is much better than changing the crops as above; notwithstanding a year's fallow is charged to one, and not to the other.

"And that the superiority of the broad-cast to the drilled wheat every year, is not owing to the expence of a fallow on the latter, and not on the former, clearly appears from the first drilled crop's being far more profitable than any of the rest; if the fallow is struck out, and only the two last crops taken, the superiority of the broad-cast will be still

greater.

"It appears (continues he) that both the modes of drilling are more expensive than the common method by sixteen or eighteen shillings per ann. which is the amount of a rent. This is a considerable disadvantage, when the profit is not proportioned. The broad-cast husbandry is just sixty times as beneficial as drilled wheat every year on the same land. Supposing the fee-simple to be thirty years purchase, the worth, per acre, is twenty-sive pounds, ten shillings; the superiority per acre, per annum, of the old husbandry, two pounds, five shillings, consequently the superior profit

profit of it more than equals the fee-simple in twelve years. The drill culture, with a change of crops, being inferior to wheat every year, the superiority

of the old is of course much greater.

"In fuch a comparison, the general cast of the season should not be forgotten.—The year 1764, was inclinable to wet; 1765, remarkably dry; 1766 and 1767, as remarkably wet; advantages or disadvantages may have arisen from this circumstance to both cultures; but the equality between the three is perfect; nor did the management of the crops occasion the superiority being on the side of the old husbandry. The strongest circumstances in the characters of these seasons were, 1765 being remarkably unfavourable to turnips, and very savourable to wheat; and 1766 and 1767 being, in general, unfavourable to corn; from whence it appears, that the drilled had the advantage, both being wheat in 1765.

"In one particular only this trial is not complete; the value of the straw and chaff is not carried to the account. This was owing partly to neglect, and partly to the difficulty of valuing it accurately; but it is not of consequence, as the certainty of the advantage being on the side of the broad-cast is indubitable, it could therefore only

strengthen the preceding arguments."-

The same gentleman, after repeating some farther experiments of the same kind, at length concludes, that it is likely to prove most advantageous for the samer to unite the old and new husbandry into one course; and as the broad-cast wheat, and more especially barley, proved superior to the drilled, but drilled beans are better than broad-cast; while broad-cast clover is the most advantageous of all, both in its own product, and as a preparation for the broad-cast wheat, he therefore recommends, that

that the united husbandry, to be formed out of the different modes, should be as follows:

- 1. Drilled beans.
- 2. Broad-cast barley.
- 3. Ditto clover.
- 4. Ditto wheat.

Substituting the profit of the drilled instead of the broad-cast beans. These four crops he has found to pay a clear profit of two pounds seventeen shillings and eleven pence per acre per annum.

Mr. Young here greatly complains of the inefficacy of the drill-plough, at the same time that he acknowledges he had a very bad one: however, to make amends he says, he has generally, in his calculations, left out the wear and tear, &c. confe-

quent upon that circumstance.

Expence

After all, one of the greatest objections to the drill husbandry, perhaps, is, the complicated nature of its implements, and the great attention it requires. This author observes, that according to the directions given by the farmer to his men in the common husbandry, every thing is plain; and should he be twenty miles off, no accident can happen which it will not be in their power to remedy without him: whereas in the drill culture it is otherwise, and the profit must, in some meafure, be trufted to chance, on account of the number of accidents to which, as he fays, a machine as complicated as an orrery may well be supposed to be subject in the hands of a countryman. " The land (lays he) is in fine tilth; the barley stops drilling-rain-a fortnight may be loft: practical men will eafily believe such accidents probable; in the common husbandry, we know them to be impossible. All fuch should be calculated, and the average carried to account, but that is impracticable; confequently, in drilled experiments, an

allowance should always be made against the mode

for expences that cannot be registered.

But with drillers for pleasure, the same objections do not hold against our modern drill-ploughs; the attention to the performance is an amusement; in such case the ploughs may, doubtless, be excellent. Beans are proved, however, to be peculiarly adapted for drilling; it is a pity that we have not a plough for that mere purpose, without any vari-

ation of feed or depth.

The same author concludes with observing, that if any gentlemen were to bargain with him for annually drilling an hundred acres of land with any plough that he could procure, being answerable under the forteiture of certain sums, that they should never stand still in favourable seasons, and should be performed by farming men without his own constant attendance, he would not undertake it under half a crown an acre for the mere drill-plough.

All this will ferve to fhew that gentleman's opinion of the drill culture in general, as being inferior in point of profit to the other; a determination which has likewise been given by others, who, like himself, have confirmed the truth of their

arguments by experiments.

The next thing we shall offer will be a few remarks upon horses and oxen, as to labour, plowing, &c. comparing them together, and briefly

giving the refult of fuch comparison.

A gentleman of good authority informs us, that the great expence of keeping horses, and the many accidents to which he found they were subject, induced him to try the mode of plowing with oxen; and the following was the state of the comparison between a yoke of them and a pair of horses.

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Expence, per acre, of plowing with horses.

the second show at general ter-	na sa wasaya	. 1.	5.	d.
Horses general expences	of the latest	0	2	I
Wear of harness -	ngs _e g vidá	0	0	01
atengenige kan di ini managahat 14 majarah 2006 di ini managahat 14 majarah 18 majarah		0	2	1 1/2
Expence with	oxen.			
General expences -	1000-3-41	0	1	9
Expence of a driver	60-5-00 J	0	0	3
Control of the state of the sta	in de la fi Rom de car	0	2	0

Oxen fuperior by 13d.

"On this comparison (says my author) it is to be observed, that though no wear is charged to oxen, yet in a term of years some small matter should be allowed for new bows; but then the amount will be fo extremely small, as to admit of no annual division. Sixpence, per annum, will answer all the expence of yokes and chains. But there are circumstances still more material in fayour of oxen. It is not clear, but that smaller ones would plow an acre a day as well as those referred to in the experiment, which were fattened up to between eighty and ninety stone (of fourteen pounds) and if so the expences would be much lower, as the cost of food would be less, and the deduction of fixpence or one shilling per week, would make a material alteration in the account. It should next be remembered, that oxen admit of no suppositions of unspecified expences, which cannot be reduced to calculation; fuch as the decline in value of horses, and losses by death, lameness, &c. for as they are kept at work for four or five years, and always changing by rotation for fattening, &c. none of these losses can be laid to

their account; nor is the ox ever configned to the kennel; neither is their any comparison in feeding, dressing, &c. between them. Upon the whole, there seems to be great reason to think, that plowing with oxen is much cheaper than with horses.

As to the different ploughs, barrows, and rollers, fince these will differ according to the fancy of particular persons, to treat of them here would be superfluous; we shall therefore confine ourselves to the implements of carriage only, which will take up but a small space, and properly conclude this treatise.

The waggon is the chief of these, and the expence seems to be great where repairs, are included; yet the use of it will make amends, where it is properly applied.

As to the tumbril, we cannot give a better idea of it to the reader, than by copying Mr. Young's

account, which is as follows:

"In the spring of 1765 (says he) I built a tumbril new, except a second-hand pair of broad wheels I bought, as also at the same time a second-hand cart for sive pounds.

"EXPERIMENT I.

and the second second					1.	5.	d.
The wheel-wright's			d wo	rk of			
the new tumbril	came	to	-	-	2	14	4
Black-smith's ditto		-		•	1	11	8
Wheels -	-		-	-	I	h	0
				-	Verifor.		The sec

The fecond-hand one five pounds where it is seen as they are kept as

iso or becomes 5d pares

five years, and always changing fattening, &c. none of these loss

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"EXPERI	MEN	T	II.		
Repairs of the two in two	The second second			17	64
*************************************		, -3	1.	City III	d.
Axletree plates		-	0	4	9
Other repairs	in ins	i	· I	3	
. As may bony to be to the particle of the second and the second a	0,11.77		1	8	0
"EXPERIM	EN	т п	T		
Repairs of ditt			Him		1
	0 170	•	•	1.00	
Axletree plates Other repairs			0 1	3	
Other repairs					_
			0 1	5	7
		6.64		-	-
"EXPERIM	EN	г. І	v.		
Repairs of ditte	o in 17	66.	71 m		
Axletree plates -			0	5	7
A new pair of broad wheels a	and tire	2	4 1	6	0
Other repairs -	•		I I	5	8
			6 I	7	3
	4		1		-
"EXPERIM	ENT	v.			
Repairs of ditto half	a year.	176	7.		

Axletree plates - - 0 2 3
Other repairs - - 2 1 10

2 4 I

" At

"At the end of the two first years, they were both valued by the wheelwright and two farmers, who fixed the two at seven pounds. At Michaelmas, 1767, the end of the above half year, they valued them again at ten pounds.

"EXPERIMENT VI.

Repairs and decline of the value of di	tto i	n f	our
years and an half.		s.	
Repairs the two first years -	I	8	0
Damage by use	3	7	0
	_		

Repairs in the last	two	years	l.	s.	d.
and one half	-		9	16	11
Increase in value	-		3	0	0

	16	
	11	

In the year 1765, these carts performed 5 journies (10 of one) of 5, 6, or 8 miles. 62 at clay, dung, and compost work. 21 at gravel and stones. 5 (10 of one) at hay, harvest, &c. &c.

In the year 1766, they did
Of the first five journies (seven of one)
Second 45 ditto.
Third 7 ditto.
Fourth 25 ditto.

In the half year 1767, they went Of the first four journies

Second

Second 12 ditto. Third 7 ditto. Fourth 21 ditto.

In all of the first 12 ditto.

Second 119 ditto.

Third 35 ditto.

Fourth 51 ditto.

The division of the expence of these two years and a half, among the above journies, in the proportion used in dividing the expence of the horses, will be as follows:

C: 1				1.	s.	d.
12 at $3^{\frac{1}{2}}d$.	-	• overill		0	3	3
119 at $8\frac{1}{2}d$.	-		*	4	4	0
35 at 1s. 11d.	-	- 10	•		19.	
51 at 21d.	•	•	•	0	18	0
				_		_
				1	4	1

The same gentleman minuted down the cost, repairs, &c. of several other necessary carriages, &c. but as all these must vary with circumstances, I thought the above sufficient to give the reader an idea of the matter.—And now having gone through with this treatise as far as relates to the business of farming, I shall conclude with observing, that as the maxims laid down in this work, are founded upon experimental knowledge, they ought to be particularly attended to by all such as would wish to be acquainted with Practical Husbandry.



